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MINOR
SURGICAL GYNECOLOGY

A MANUAL

OF

UTERINE DIAGNOSIS AND THE LESSER TECHNICALITIES
OF GYNECOLOGICAL PRACTICE

FOR THE USE OF THE

ADVANCED STUDENT AND GENERAL PRACTITIONER

BY

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WITH THREE HUNDRED ILLUSTRATIONS

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TO

My Esteemed Friend,

FORDYCE BARKER, M.D., LL.D.,

IN REMEMBRANCE OF MANY KINDNESSES,
THIS BOOK IS GRATEFULLY
DEDICATED.

PREFACE.

> "Success in the treatment of the diseases of women lies wholly in attention to minute details."—(EMMET.)

EVERY recent text-book on the Diseases of Women contains a brief reference to the minor technicalities and manipulations commonly employed in the diagnosis and treatment of these affections. But the scope of a work which covers the whole vast field of gynecological science, does not permit the detailed discussion of many practical points which the student and practitioner should know, and is obliged to learn with many annoyances in the course of his practice. Nowhere, except perhaps scattered through periodical literature, can many of these topics be found, and nowhere can the experience, so dearly acquired after many attempts and failures, be more rapidly obtained except by a visit to one of the large medical centres in which practical gynecology is taught. Of course, no book can supply the knowledge gained at the bedside or operating-table; and no description, however minute, can enable the examining finger to distinguish between a retroverted uterus and a retro-uterine fibroid or pelvic cellulitis. But many an error may be avoided, and many a manipulation rendered easy for physician and patient, if the sources of possible error and the details of the manipulation be clearly laid before the operator. With this object this book has been prepared. Its necessity may not be apparent to the gynecological expert who, by years of practice, has familiarized himself with all the details of his specialty, nor to the interne of the Woman's Hospital, whose daily duty teaches him the very applications which are here described. For neither of these, be it distinctly understood, is the book intended. But I have been led grossly into error by the expressions of many general practitioners, and my experience as an instructor in practical gynecology is utterly at fault, if the student and young

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A TREATISE ON

MINOR SURGICAL GYNECOLOGY.

INTRODUCTION.

GENERAL CONSIDERATIONS INFLUENCING THE DIAGNOSIS AND TREATMENT OF GYNECOLOGICAL CASES.

THE practice of gynecology is beset with difficulties and restrictions inherent to the delicate character of the subjects and organs which it embraces, and met with in no other special branch of practical medicine. While the physician will rarely find objection to an examination of the throat, eye, ear, lungs, or abdomen in either sex, he will very frequently encounter the most decided opposition to the desired and indispensable exploration of her genital organs on the part of his female patient—an opposition natural, of course, and entirely consistent with the inborn modesty of her sex, which we are bound to respect. To overcome this opposition without injuring the sensitiveness of the patient is manifestly a delicate and difficult task, the accomplishment of which may often require all the tact and gentleness, combined with firmness, at the physician's command. It is this very difficulty of procuring a physical examination of the female genital organs which renders the practical study of the diseases of these organs so laborious, and requires nine-tenths of our medical students to go into practice without the slightest practical knowledge of this specialty. With auscultation and percussion, laryngoscopy and ophthalmoscopy, they have all had abundant opportunity to become familiar, since in such courses the number of participants need only be limited by the convenience of the teacher, and the abundance of his clinical material; but the necessity of limiting a practical course on gynecology to one or two men necessarily debars the great majority of students from taking part in such instruction, which is moreover not permitted in all public institutions. In this respect America is no worse than Europe—

indeed, I think the facilities for the study of practical gynecology are greater for the mass of students in New York than in any foreign university city of my acquaintance.

Again, the peculiar situation of the female genital organs requires the education, chiefly, of the sense of touch as a means of diagnosis; and this sense, while relatively and individually sufficiently capable of accuracy, is still not so absolute as the senses of sight and hearing. A color or a sound will, as a rule, not be disputed; but there may be very different opinions as to the degree of hardness or softness, of form or size of a body as detected by the examining fingers. It thus happens that equally eminent and experienced gynecologists may arrive at very dissimilar conclusions in a certain case, or that we may be unable to give a positive opinion on the nature of a tumor, or the existence of early pregnancy, without being to blame for want of practice or acuteness. And this may happen even though the tumor in the uterus be readily palpable; if its position, or the rigidity or thickness of the abdominal walls, should interfere with the examination, the latter is manifestly greatly obstructed. The student should therefore remember that, while his endeavor must be to acquire the greatest possible amount of tactile experience, he should avoid hasty examinations and conclusions in overconfidence in his well-trained finger.

Very frequently our diagnosis is necessarily doubtful or impossible, because certain organs are inaccessible to the touch; such as, usually, the ovaries, tubes, ligaments. In view of all these difficulties it is important that all the rational signs be carefully inquired into and noted, and even extraneous symptoms considered, before making a diagnosis.

Gynecological manipulations may be greatly influenced by the age, physical condition and temperament of the patient.

It very rarely becomes necessary to make a vaginal examination *before puberty*, because the diseases which call for such an examination seldom arise until after the inception of the menstrual function, and are, indeed, in by far the larger majority of instances the direct result of parturition. A catarrhal inflammation of the vulvar orifice and a leucorrheal discharge are not uncommon affections in young girls, and may call for an ocular examination, but the suspicion or presence of a stone in the bladder is almost the only disease requiring a closer exploration of the ante-nubile female genitals. In retarded puberty, with regular menstrual molimen, an increase in size of the abdomen will excite suspicion of imperforate hymen or vagina and retained menstrual discharge, a suspicion only to be verified by examination. It should be borne in mind in such cases that there may be another cause for the abdominal enlargement and suppressed menstruation, and the physician should be careful not to allow himself to be misled by the statements of the patient or her friends, and thus overlook a possible pregnancy.

Young *single women* very frequently complain of menstrual disorders, chiefly dysmenorrhea, and present symptoms indicative of uterine or ovarian disease. If possible, an examination of a single woman should be deferred until an attempt has been made, by medicines and hygienic measures, to overcome her symptoms. Thus, in functional or ovarian dysmenorrhea, it may be possible to relieve all symptoms by such remedies as the tincture of gelseminum, or pulsatilla, or apiol, or a laudanum enema or opium suppository, or a blister or iodine over the ovarian region. But in no case should this attempt, if unsuccessful after a fair trial, be allowed to conclude the treatment. If the symptoms still continue, a local examination should be proposed and gently but firmly insisted upon. If positively refused, the physician should consider whether it is fair to the patient and himself to continue treating her while he is in total ignorance of her disease, and whether it is not due to his reputation to decline her case unless she permits an exploration. He should reflect that by continuing palliative general measures for some time he may possibly secure the confidence of the patient sufficiently to gain her consent to an examination, or induce her relatives to overcome her scruples. If she should still persist in a refusal, he no doubt is justified in then putting before her his ultimatum of examination, or discharge from his care.

The necessity for a genital examination may become imperative in case of an unmarried woman presenting herself for menstrual suppression, when the physician employs the precaution of palpating her abdomen through the clothes and finds there an enlargement and a tension which leads him to suspect pregnancy. In at least a dozen cases have I thus found it necessary to insist upon a genital exploration in apparently perfectly innocent young girls, and found a pregnancy advanced to five months and more. Although a menstrual suppression of a few months is not unusual in single women, frequently as the result of a change of climate, I never, in cases of suppression, neglect the above precaution of a superficial palpation of the abdomen through or under the clothes while the patient is standing before me, and only when I find no enlargement do I defer or entirely omit a vaginal examination.

In a *virgin* the presence of the hymen will, as a rule, limit the examination to the digital per vaginam and rectum, or, if the hymen be very rigid and its aperture unusually small, a vaginal examination may be impossible and that per rectum must be substituted. In certain cases of importance or emergency it certainly is justifiable to examine even at the risk of rupturing the hymen, as when the introduction of a pessary is necessary or the presence of a cervical catarrh or erosion is suspected.

As a rule, a local exploration is to be avoided during the *menstrual period*, not, be it understood, because indagation or the speculum would be likely to injure the patient at that time, but because it is unpleasant to every woman to be seen and handled while she is soiled. There are occasions, however, when it is advisable and even necessary to examine during the flow, as, for instance, when it is desired to introduce the finger into the cervical canal to detect the supposed presence of an intra-uterine growth, or in the occasional cases of so-called intermittent polypus, when the tumor appears at the external os during the menstrual flow, and is retracted in the interval. We should, however, never hesitate, on mere esthetical grounds, to demand and make an exploration when the persistence of the sanguineous flow requires immediate diagnosis and treatment. Operative procedures, it need scarcely be said, are not to be undertaken during or near the menstrual epoch, with, perhaps, the exception just mentioned, when a persistent menorrhagia requires to be checked at once by tamponing the vagina, by the introduction of styptics into the uterine cavity, or by the removal of the exciting cause (vegetations, polypus, fibroid). The appropriate time for operations on the female generative organs is in the interval between two or three days after the flow and the week before the next period. The danger from hemorrhage, which has deterred surgeons from operating near the menstrual period, has, according to Simon, of Heidelberg, been greatly exaggerated, for this eminent surgeon even advocated that period as a favorable one for plastic operations on the ground of the greater hyperemia of the tissues. That the prevalent idea is incorrect—that the occurrence of menstruation soon after an operation will probably prevent primary union—I have myself observed in three operations for lacerated cervix, in which the flow came on unexpectedly within two days of the operation and lasted a week, the stitches not being removed until several days after its cessation, when union was found to be perfect. As a rule, we must consider the occurrence of menstruation during convalescence from an operation on the genital organs as undesirable, if only for the reason that it prevents the usual cleansing vaginal injections so useful in plastic operations on the cervix, vagina, and vulva. The danger of preventing union by the oozing of blood between the fresh surfaces need scarcely be feared if the latter are properly approximated by the sutures.

Pregnancy, and, particularly, *the puerperal state*, will counter-indicate all local operative procedures in a far greater degree than the menstrual period. While it is true, according to observations recently published by Verneuil, that pregnant women bear even severe operations on other parts of the body with remarkable toleration as regards their pregnancy, it nevertheless is not advisable, except in cases of urgent necessity, to use the knife in the vicinity of the genitals at that time. Such cases of necessity are the encroachment on the pregnant uterus of a rapidly growing ovarian tumor, when paracentesis, or the removal of the tumor, may become necessary, and have been repeatedly successfully performed without interrupting the gestation; further, the constriction of the cervical orifice by cancerous disease, when the removal of the cervix is indicated; the removal of a polypus with deep-seated pedicle, which might interfere with the passage of the child's head; the removal of vaginal or labial growths, which might likewise obstruct parturition. The period during pregnancy when such operations are to be performed will generally depend on the urgency of the case.

Intra-uterine fibroids, which might interfere with parturition, are manifestly not amenable to treatment during pregnancy; in such cases the induction of premature labor or, if too late, Cesarean section are the only alternatives. Minor operations, such as laceration of cervix or perineum, prolapsus vaginæ, should be deferred till after puerperal convalescence, since the freshly united surfaces would probably part during the expulsion of the child. While the above operative procedures may interrupt the pregnancy, as happened to me after amputation by the galvano-caustic loop of an enormous epitheliomatous cervix during the fourth month, marked exceptions may occur, as in a case of operation for lacerated cervix where I assisted a friend, and it was not discovered until some time after the successful result that the woman, at the time, was between two and three months pregnant. She went to term, twins were born, and the cervix was but very slightly torn.

As a rule it is advisable to abstain from excessive manipulation of a *pregnant uterus*. Thus pregnant women should be cautioned against using *hot* vaginal injections, and instructed to introduce the nozzle of the syringe carefully and but a short distance, and to employ tepid, perhaps slightly astringent injections if the ordinary leucorrhea should be unusually irritating. The physician may occasionally be induced, for this same leucorrhea, to introduce medicated pledgets of cotton, or apply an astringent solution to the vaginal mucous membrane through the speculum; or, as recommended by Jones and Sims, apply nitrate of silver to the eroded cervix, as a cure for obstinate vomiting; but all these procedures should be conducted with unusual caution, and with the constant remembrance that however tolerant the non-pregnant uterus is, the impregnated organ will, with rare exceptions, brook but little interference. In making this statement I wish it distinctly understood that no *necessary* procedure should be neglected by reason of the pregnancy. Thus, a woman, who becomes pregnant while wearing a retroversion pessary, should continue wearing that or eventually a larger pessary until the advent of the fourth month has raised the fundus uteri above the sacrum and removed the danger of incarceration of the retroverted fundus. The same rule applies to the support of a replaced gravid uterus by a pessary, when the retrodisplacement did not occur or call for relief until after conception and enlargement of the uterus. Likewise a woman with a protruding rectocele, which has become chafed and eroded by friction against her clothes, should not be compelled to forego the comfort afforded her by a suitable ring pessary or the daily introduction by the physician of an astringent tampon, simply because she is pregnant. Gradually, as the uterus rises, the vagina becomes stretched upward, and the rectocele disappears.

During the *puerperal state*, operations should be entirely avoided, always excepting, of course, the immediate closure of a perineal rent. The greater tendency to septic infection at that time, and the dilated condition of all the pelvic blood-vessels, are sufficient reasons for this rule. After eight or ten weeks, when puerperal convalescence has become fully established and genital involution has taken place, no counter-indication to an operation exists on that score. *Lactation*, however, may prove an obstacle in the influence which anesthesia, excitement, and perhaps suppuration may have on the secretion and quality of the milk. Operations, which by the quiet or position entailed by them interfere with the convenient application of the child to the breast (ovariotomy, perineorrhaphy), may need to be deferred until that function has ceased; but an operation like that for lacerated cervix does not, in my opinion, interfere in any way with nursing, and need not, therefore, be postponed if its speedy performance is at all desirable. In cases, however, where the injury produced during labor was so great as to seriously inconvenience the patient and retard her convalescence, as in severe perineal laceration with uterine descensus, I do not consider lactation a counter-indication to an operation as soon as involution has taken place. I have thus operated several times on lacerations through the sphincter ani, where the alvine functions were interfered with, in the third month after labor, using no precautions except not to apply the child to the breast for eighteen to twenty-four hours after the operation, when the anesthetic had been entirely eliminated; and in no case was lactation interrupted, the child injured, or complete union interfered with.

A pessary may very often require to be introduced before the lying-in woman leaves her bed, in order to prevent the formerly displaced uterus from returning to the abnormal position which it occupied before the last pregnancy; indeed, the rectification of the displacement at this time, when all the sexual organs are undergoing a process of involution, offers one of the best chances of entirely curing the patient. I have thus applied a retroversion pessary on the eighth day after delivery, removing it after two months, and found the uterus permanently replaced.

The *temperament* of the patient may influence the feasibility or advisability of an examination or operation very materially. A nervous, excitable, hysterical woman will require to be treated with vastly more gentleness, persuasiveness, and, at the same time, decision, than a quiet, sensible patient, in order to secure her consent to an examination or operation. Some patients are so excited by every examination or local treatment, as to necessitate the cessation of the treatment, finding that the local benefit is more than counterbalanced by the general excitement. Thus, I have one patient in whom the mere introduction of the sound produced such general nervous excitement for several days, that I dared not repeat the manœuvre, and have, in fact, been compelled to desist from all local treatment for the same reason. The physician should carefully discriminate in such cases, and not be misled into considering his manipulations as the cause of the psychical symptoms when they are really the effect of the sexual disorder. Neither should he persist in the local treatment, if he finds it counter-indicated by the nervous symptoms. Many patients shrink from the mere word "operation," as they would from a pestilence; therefore, always qualify your statement that an operation is necessary by omitting that word, and speaking of "closing up" or "sewing a tear," for instance, until the patient has become accustomed to the idea. Many a patient have I in past years frightened away by incautiously telling her that an "operation" would have to be performed.

In the same class of patients the question should be considered whether the administration of an anesthetic is advisable, and whether the operation will be likely to increase or diminish the mental symptoms. If the fear of the operation is so great as to arouse permanent mental disturbance, of course, it must be postponed or given up. On the other hand, we may often hope for an improvement in the psychosis from the operation, even though the lesion for which the latter is performed cannot be looked upon in the light of its cause; as, for instance, the removal of cicatricial tissue at the perineum, and the closure of a gaping vulvar orifice, which had produced marital infelicity, sterility, and melancholia on the part of the wife, or the excision of a cicatricial plug from a cervical rent and closure of that rent, which had induced general and cerebral anemia with its concomitant neuroses. The moral effect of an operation should also be taken into account in forming an indication, although too much stress should not be laid on this reason to the overshadowing of the physical condition. No doubt much good might be done by the judicious and discriminating operative treatment of female insane patients whose genital organs display some defect curable by operation, provided the case be not of too long standing.

The *advanced age of a patient* should not deter us from insisting on an examination, whenever it may appear desirable. Particularly should women be taught that the climacteric age, while not in itself serious or dangerous, still has been found by experience to be especially favorable to the development of malignant disease; and that, therefore, the slightest derangement, the least excess of menstrual flow, or leucorrheal discharge, may be the first indication of serious or fatal disease, which can only be detected by an examination, and whose only hope of cure consists in that examination being as early as possible. Neither should the age of a patient deter us from an operation which appears justifiable either through the inconvenience or danger of her disease, the inability of relieving her by other means, or the hope of prolonging her life. Ovariotomy has been successfully performed after the seventieth year. In cases of prolapsus uteri, however, it may be questionable whether it is worth while, in view of the usual merely temporary results following the operations for that deformity, to subject a patient of over sixty years to the operation. If a bandage or contrivance can be found which will retain the organ within the vulva, an operation is scarcely called for. However, the decision will depend on the features of each individual case.

The peculiar situation of the internal female organs of generation, the large networks of vessels surrounding them, the sensitive character of the connective tissue in which they are encased, and chiefly the proximity of the peritoneum, render their examination and treatment a matter of difficulty and danger. It should be remembered, that, while the uterus has the reputation, and justly so, of being the most patient and the toughest organ in the body, it or its surroundings will at times respond severely to the slightest touch. While one uterus will bravely bear the application of fuming nitric acid to its interior or the excision of a fibroid from its wall, another will react severely on the application of a sound or even bimanual palpation. While one peritoneum will not mind the separation of adhesions and the contamination of putrid ovarian fluid, another will react by a furious inflammation to the slight tension exerted on it while drawing the uterus down to the vulva. All this should be borne in mind in stating the dangers of an operation. Furthermore, we should consider that the previous existence of chronic or subacute peri- or parametric inflammation renders the parts vastly more liable to a return of such inflammation, the extent of which cannot be foreseen. As a rule, the presence of evidences of previous inflammation of the peri- or parametrium should be looked upon as a counter-indication to active operative measures or to irritating applications to the uterus, and all inflammatory residue should be removed or rendered inert (cicatricial) by appropriate treatment, before a new operative procedure is ventured upon.

The proximity of the bladder and the rectum may also serve to complicate gynecological measures. The position of the uterus varies physiologically with the fulness or emptiness of the bladder and rectum, and the necessity for evacuating the contents of both these organs at stated intervals naturally interferes more or less with the process of restoration after operations on these parts. Thus, the catheter needs to be passed regularly, or the urine allowed to flow over a freshly united perineum, which latter occurrence has long been supposed to prevent union; more recent experience has shown, however, that healthy urine does not interfere with the healing of fresh wounds—witness lithotomy wounds. Then the passage of firm scybalous masses may sunder a freshly healed perineum. Inflammatory edema, after operations on the genitals, may extend to the urethra and cause retention of urine; or the introduction of purulent matter into the bladder on the catheter may produce cystitis. The constant rhythmic motion of the uterus and anterior vaginal wall with each inspiration and expiration may annoy the inexperienced operator, and great difficulty is often met with in separating the lax, rugous walls of the vagina sufficiently to gain a clear view of the field of operation. Great compensating advantage is gained, on the other hand, in precisely such cases, as indeed in all where the normal mobility of the uterus is preserved, by the possibility of drawing the uterus with tenacula down to the vulva, and thus bringing it within easy reach of the operator.

These general remarks on the peculiar features of gynecological technics might be largely extended, but other special points will be referred to in the separate chapters. In closing this section, I will merely impress upon the practitioner and embryo gynecologist this one cardinal rule:

Never omit to make a vaginal examination whenever the symptoms point in the least degree to possible disease of the sexual organs; consider, that it is as unscientific and irrational to attempt to diagnose or treat sensibly an affection of these organs without a thorough examination, as it would be in the case of the lungs or any other portion of the body. This caution will not appear unnecessary to those members of the profession, who, as I do, frequently meet with cases of long-standing uterine disease, which have been treated (Heaven save the mark !) for years and years by general practitioners without a local examination ever having been proposed.

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PART I.

GYNECOLOGICAL EXAMINATION.

1. Verbal Examination.

When a female patient consults a physician in general practice, the probability is that the latter will inquire into her symptoms without special reference to any set of organs, and, having no specialty, will treat her by general remedies to the exclusion of the very means which her condition requires. On the other hand, the specialist in uterine disease is too prone to ignore the influence of derangement of other organs on the sexual system, and to look upon the uterus and ovaries as the fountain-head of all other diseases in the female sex. Both parties are manifestly in the wrong; the general practitioner who treats a leucorrhea, arising from lacerated cervix and endocervicitis, by iron and simple cleansing injections, or the sacralgia of a retroverted uterus by a plaster to the back; and the specialist who attempts to check a menorrhagia dependent on plethora of the portal system by intra-uterine styptics, or cure the amenorrhea of chlorosis by local irritants. Both the too general and the too specialistic course should be avoided, and, in taking the history of a patient, all the signs should be carefully noted, which are, in any way, abnormal, or point to the possible seat of disease. In no case should the gynecologist persist in attributing all the constitutional symptoms to the sexual organs when a careful examination has failed to show him any distinct sign of disease in those organs. The determination of the precise amount of influence of an areolar hyperplasia of the uterus, or so-called chronic metritis, in the production of the peculiar neuroses and psychoses so frequently met with in that common affection will, in my opinion, prove one of the hardest tests of his discrimination and judgment in this respect.

For the benefit of these gentlemen, whose tendency toward some other than the gynecological specialty might lead them to overlook the existence of uterine disease, I will refer to two highly instructive cases which have come under my notice within the last few years. In one, the young lady after a severe fall on her nates, began to show signs of mental derangement, which gradually developed into settled melancholia; after no improvement from a six months' stay in a celebrated institution in a neighboring city, she consulted one of our rising young neurologists nearer home, who again failed to relieve her. Finally, acting on the advice of some friends, she consulted a notorious female irregular, whose specialty is female diseases. The inevitable examination followed, a retroversion was readily detected, the uterus replaced and retained by an ordinary pessary, and lo and behold! in three weeks the lady's melancholia disappeared, and she returned home well; of her continued good health I myself am a frequent witness. The other case was that of a lady confined to her bed for several years by an apparent paresis of the lower extremities, for which various celebrated neurologists had treated her in vain. She chanced to fall into the hands of one of our younger gynecologists, who suspected possible uterine disease, examined, found a retroflexion, introduced a pessary, and in a few days the paralytic patient walked!

In taking the history of a female patient complaining of sexual disease, the physician should, after the usual inquiries of name, age, residence, nationality, ascertain the occupation of the patient, whether it is very laborious, or the contrary, whether it is such as is likely to exert any particular influence on the sexual organs, such as the habitual use of the sewing-machine. Further, he should inquire if the patient is married, if so, how long, how many children she has had, how many miscarriages; how long since her last confinement or miscarriage; whether all her labors and gettings-up were easy and natural; whether instruments were used; how long she has been in poor health; what diseases she has had; whether her parents were healthy. He should then inquire about her menstrual function, at what age it first appeared, whether it was always regular, its duration and character, its freedom from pain, or the reverse; when it last occurred. (The last question should never be omitted, as there can be no doubt that many a sound has been hurriedly passed, and an abortion thereby produced, simply because the patient was not induced to tell that she had gone one, two, or more weeks over a menstrual period. True, the woman may intentionally make a misstatement on this subject; but then, at least, the physician is exonerated so long as the slight increase in size of the uterus does not enable him to detect the early pregnancy.) The patient should further be questioned as to the seat, character, duration, and persistency of any pain she may experience; if she is married, as to whether coition is painful; whether she has a vaginal discharge, its amount, character, and duration; whether micturition is free, abundant, or painful; the condition of her bowels, whether regular, constipated, or painful; as to her appetite and digestion, and her general health; the presence of hereditary disease in the family; the suffering of the patient from chlorosis during her early menstrual life, or the previous occurrence of perimetric inflammation, are particularly important data. In old patients the time and character of the menopause should be inquired into.

In estimating the usually long array of symptoms presented by a patient suffering from sexual disease, it behooves the physician to take heed of any and all symptoms, no matter how abstract apparently, which his reading or experience have taught him to have a possible connection with the disorder for which he is consulted, and to endeavor to give them their proper origin and value. The disorders of nutrition and innervation which occur so commonly in utero-ovarian disease as to be properly considered as more or less dependent upon it—the hystero-neuroses, to use the comprehensive and convenient term of Engelmann—are met with in almost every organ and tissue of the body, and in many cases, if still in their early stages, yield spontaneously with the improvement in the genital affection. Still, it will generally be found advisable, both as a comfort to the patient and a means of retaining her confidence, to treat such symptoms in other organs as seem to require special remedies. Such hystero-neuroses are: dyspepsia, chiefly belching, cardialgia, nausea, loss of appetite (a common accompaniment of ovarian congestion); tympanites; hemicrania, general cephalalgia, mammary, intercostal, and other neuralgiæ; the various hysterical symptoms, globus hystericus, general nervousness, hiccup, fits of laughing and weeping, convulsive actions, paralyses; cutaneous eruptions, acne, chloasma, eczema. A frequent occurrence is the enlargement and tenderness of the breasts during menstruation and uterine disease.

The symptoms which chiefly attract the attention of the physician to the pelvic organs are: sensation of weight or bearing-down, or falling in the abdomen and pelvis, a pain in the hypogastric, inguinal, or sacral regions; darting or radiating pains from the pubis down the thighs, or into the inguinal or hypochondriac regions; pain on defecation and micturition; dyspareunia; inability to take even moderately long walks or to go up and down stairs; pelvic pain on sitting; itching of the external genitals; leucorrhea; amenorrhea, or dysmenorrhea; meno- or metrorrhagia. To ascertain the approximate amount of blood lost the best way is to inquire how many napkins (provided she uses them) the patient soaks through every day. In estimating the value of leucorrhea as a symptom, it should be remembered that, with the exception of cases of general anemia, it is merely a symptom indicative of more serious disease, and not the disease itself; also, that the character of the discharge, whether whitish, greenish, sanguineous, serous, ropy, or offensive, is of importance in indicating the seat and nature of the internal affection.

The importance of recognizing and appreciating the *significance of pain* as a means of diagnosis of pelvic disease in the female leads me to say a few words on this subject.

As a rule, pain in the lower part of the abdomen or the pelvis of a woman indicates that she is the victim of some functional or organic disorder of one of the organs contained in these cavities. It by no means follows, however, that pain in other portions of the body should not be referable to the pelvic organs. Pain in the suprapubic region generally denotes chronic or subacute enlargement (hyperplasia or subinvolution) of the uterus. If the sensation is spoken of more as that of motion, "as though a child were moving about in the abdomen," I have found it to indicate, with almost unerring certainty, the presence of hyperplasia or subinvolution of an aggravated degree. If the feeling is that of weight, weakness, or forward pressure, an anteversion or anteflexion, with or without moderate descensus may generally be expected. If there is bearing-down, a feeling "as though everything were going to drop out," descensus, prolapsus, or retroversion or -flexion will probably be found, or a mere cystocele or rectocele may produce a similar sensation.

A dragging, aching pain in either groin, extending down the thighs, generally depends on prolapsus and retrodisplacement. Expulsive pains in the uterine region denote a desire on the part of the uterus to expel some foreign body, such as a fibroid, a detached ovum, retained menstrual fluid. Pain in the ovarian region does not always indicate disease of the ovaries; for it very frequently is of reflex character, depending on inflammation, laceration, or hyperplasia of the cervix. Still, when we find a more or less acute boring, often darting, shooting pain in that region complained of, we can generally expect to find the ovary enlarged and congested, or prolapsed; in the latter case the pain is generally deeper-seated and extends to each hip or sacro-ischiatic notch. If the ovaries are the seat of pain, the latter will be found to be aggravated just before the menstrual period.

Pain in the back, if in the lumbar region, generally has no direct connection with utero-ovarian disease. It may, however, possibly denote in cystitis a spread of the catarrhal disease up the ureters to the renal pelvis.

If in the sacrum, however, the pain generally gives rise to a suspicion of a retrodisplacement of the uterus, or of prolapse of one or both ovaries; or an acute, subacute, or chronic (so-called) perimetric inflammation. In the latter class of cases it by no means follows that the plastic exudation is of great amount, forming an actual tumor; while, as a rule, the sacralgia increases in proportion to the size and extent of the exudation. I have seen mere diffuse infiltration and cicatricial induration of the retro-uterine cellular tissue and peritoneum accompanied by the most intense, continuous sacral pain. In some cases nothing but a diffuse, boggy condition of the retro-uterine tissue will be found to account for the pain, which may, perhaps, be looked upon as edema of the cellular tissue, or subacute sacral periostitis. These cases are exceedingly obstinate against treatment. Very frequently nothing whatever will be found to account for the sacralgia, which we are then forced to consider a veritable reflex neuralgia proceeding from a hyperplastic uterus or congested ovaries, and which is often benefited by counter-irritant applications to the skin of the sacrum and lumbar region. Occasionally the "backache" is lower down toward the coccyx, and will be found to depend on a catarrhal inflammation of the rectum. Pain on defecation may be caused by a retrodisplaced inflamed uterus or ovary (particularly the latter, when the pain lasts for some time after the passage), or by a fissure at the anus, or by hemorrhoids.

I have met with a number of cases in which the pressure of the hard cervix of a hyperplastic and partly prolapsed uterus on the posterior wall of the vagina caused severe pain near the junction of the sacrum and coccyx. Occasionally the coccygodinia is due to dislocation, or anterior anchylosis of the coccyx; in some cases caries or necrosis of the bone is present, and in others there appears to be a simple neuralgia of the bone.

A pecular pain in the hip, somewhat above the ischiatic notch, is frequently indicative of ovarian disease; a blister over the painful spot may, however, relieve the pain and prove it to be merely sciatica.

Pain in micturition, if it be of a scalding character, generally indicates acute cystitis or urethritis, or a highly acid state of the urine; if spasmodic, tenesmus, the presence of a fissure or caruncle of the urethra, or merely a hyperesthetic condition of the circular fibres of the neck of the bladder induced by chronic cystitis. The latter condition is particularly distressing and obdurate. Prolapse of the floor of the bladder—cystocele, —or sacculation of the urethra—urethrocele—may also give rise to pain and delay in micturition.

Pain in the vulva generally means some inflammatory or ulcerative condition of the labia or introitus vaginæ, such as simple vulvitis, or folliculitis vulvæ, or inflammation of the Bartholinian gland, or chancroid or some other injury or disease. It should lead us always to inspect the vulva before proceeding to indagation.

Pain in the legs, if down the anterior aspect of the thighs, may denote downward or forward displacement of the uterus; if down the back of the thighs, retrodisplacement of uterus or ovaries, or cellulitic deposits, which exert pressure on the sacral nerves.

Pain in the intercostal spaces very often depends on ovarian disease, and is more frequently connected with the left ovary, and therefore also met with as cardialgia. Hemicrania (migraine) and pressure on the vertex and occiput are very commonly met with in connection with menstrual disorders, or occur at the time of menstruation, particularly if the flow is scanty.

Pain in the epigastric region is one of the commonest symptoms in uterine disease next to the local signs. It shows the intimate relation between the sexual and the digestive organs, and generally depends on functional derangement of the stomach. Vomiting is less frequently met with—nausea more so—and should lead the physician to inquire particularly about the time of the last menstruation and suspect pregnancy, especially if it occur chiefly in the morning. In some patients nausea and vomiting is caused by pressure on a congested or inflamed ovary. I have thus repeatedly produced it at will.

Pain is very often changed or aggravated by walking, standing, lying or sitting down. This is particularly the case in displacements (even in anteflexions in young girls the suprapubic pressure and discomfort is increased thereby) and pelvic inflammation. An increase of pain in sitting down would indicate that pressure was exerted on an organ in that position, which was not exerted in the erect posture; thus a prolapsed and congested ovary would naturally be squeezed between the uterus and pelvic wall, by the downward pressure of the intestines in the sitting posture—I have such a case in mind—or an inflamed, carious, or hyperesthetic coccyx, or prolapsed and inflamed hemorrhoid would manifest itself by pain chiefly when pressure is made directly upon it when the patient sits down. Again, a patient with an inflamed ovary, or an acute pelvic exudation, will not be able to lie on the affected side, because the pressure of the superincumbent viscera increases the pain.

I have already stated that pain as a diagnostic symptom of utero-pelvic disease is of great value. Still it is by no means implicitly to be relied upon, and should be utilized only as an auxiliary or guide to diagnosis. Thus I have frequently found women who complained of the most acute abdominal, sacral, and systemic pain, present absolutely nothing but a moderate hyperplasia uteri (these pains were evidently hystero-neurotic); and again patients with scarcely a local symptom have surprised me by the discovery of a severe displacement, laceration, or even malignant disease. The peculiar character of the pain is also misleading; thus I recollect one case of a woman who consulted me for a constant sanguineous discharge, saying that she had expulsive pains like labor pains. I said to my students that a continual sanguineous flow in a woman of her years would lead me to suspect malignant disease, but that the expulsive pains were much more characteristic of fibroid, probably a polypus. An examination, however, revealed a large epithelioma of the cervix.

Pain during menstruation is very common, particularly in unmarried women and nulliparæ. If occurring before the flow, it generally denotes ovarian congestion, if at the inception of or during the flow some obstruction to the free discharge of the blood, such as constricted cervical canal, or flexion. Since the majority of women experience more or less local and systemic discomfort immediately preceding, and less frequently during the menstrual flow, the physician must be guided by the intensity of the symptoms in deciding on the necessity for treatment. A very peculiar pain occurring about the middle of the intermenstrual period is not unfrequently complained of; it resembles closely that experienced by the same individual at the regular epochs, and is generally accompanied by increased genital secretion. It has been called by Priestley, who was one of the first to describe it, "intermenstrual dysmenorrhea," and appears to depend either on intermediate ovulation or on inflammatory exacerbations in the ovaries. It is frequently accompanied by anteflexion and chronic pelveo-peritonitis.

The causative agencies of the symptoms ascertained during a verbal examination should be carefully inquired into under the head of general or predisposing, and direct or local causes. The predisposing consist of previous ill-health, hereditary tendency, overexertion, too frequent labors and too early gettings-up, masturbation, tight lacing, confining or peculiarly injurious work (sewing-machine), too luxurious life, etc.; the direct, of local injuries by parturition, too frequent or unnatural coition, injections, pessaries, cauterization, exposure to cold or sudden violence, particularly the puerperal state.

In order to guard against omitting important points the physician will do well to follow a specified order in asking questions and learning the history of the patient, in which task he should endeavor to adapt himself to the patient's way of telling her story.

All the symptoms, local and general, having been systematically ascertained and noted, the physician should, if the information obtained warrants it, propose a vaginal examination with the precautions above specified.

2. Methods of Local Examination.

The peculiar seat and character of the female generative organs requires for their examination methods and maneuvres, for the most part, entirely different from those employed in the exploration of other organs of the body. To be sure, we make use of the eye and the ear in this examination, but the special use of the finger, the speculum, and the sound, is peculiar to a gynecological examination.

The methods at our disposal for the local examination of the female generative organs are the following:

I. *Non-instrumental methods.*

A. Inspection of the external genitals and abdomen.
B. Auscultation and percussion of the abdomen.
C. Palpation of the abdomen.
D. Digital examination; a, vaginal; b, rectal; c, vesical.
E. Conjoined examination; a, vagino-abdominal; b, recto-abdominal; c, vesico-abdominal.
F. Digital eversion of rectum.

II. *Instrumental.*

A. Exploration of urethra and bladder with catheter, sound, or endoscope.
B. Examination of the vagina, cervix, and external os with the speculum.
C. Examination of the uterus with the sound and probe.
D. Dilatation of the uterus for purposes of diagnosis.
E. Examination of the uterus with the blunt curette.
F. Artificial prolapsus of the uterus for diagnostic purposes.

G. Examination of the rectum with the speculum.
H. Mensuration of the abdomen.
I. Aspiration of pelvic and abdominal tumors.

Is it evident that the greater portion of these methods will be unnecessary in the majority of cases, or that the order in which they are employed may be greatly modified by the necessities of the occasion. Thus, inspection may be deferred till the last, or until the application of the speculum requires the exposure of the parts; or auscultation and percussion are entirely unnecessary, or the vesical and rectal examinations are uncalled for. Dilatation of the uterus would manifestly be required only when more simple and ready means fail in establishing a diagnosis.

As a rule, the order of examination of a gynecological patient is the following: 1, inspection of the external genitals; 2, examination with the finger and conjoined manipulation; 3, introduction of sound; 4, examination with the speculum.

As it is our duty to endeavor to gain as correct and complete an idea of our patient's condition as science and her physical and mental condition allows, it is always advisable, unless counter-indications (to be specified hereafter) exists, to employ all innocuous means in our power in making a diagnosis. For this reason, at a first interview, or as soon thereafter as practicable, the sound and speculum should be employed, even though they may not again be needed.

It is well to accustom one's self to a certain fixed routine of examination, but this routine should always be made to vary in accordance with the results of previous statements and examinations; thus we should not pass the sound, when we learn that the patient has skipped a menstrual period, or lacerate a hymen merely for the routine purpose of introducing the speculum.

A very excellent plan of dividing the methods of examination is that by the exercise of the senses, thus:

a. Examination by the touch: palpation; indagation and conjoined manipulation of vagina, rectum, and bladder; introduction of the sound.
b. Examination by the sight: inspection, mensuration, specula.
c. Examination by the hearing: percussion and auscultation.
d. Examination by the smell: the odor of vaginal discharges, indicative of infectious or malignant disease, or of communication with the intestine.

I have preferred to classify the methods as non-instrumental and instrumental, as most easy for systematic description.

It is needless to enforce upon the examiner that the greatest gentleness, delicacy, and refinement are of paramount importance in making a genital examination, if he would avoid increasing the distaste which the patient naturally feels at the disagreeable necessity, and insure her submission to a repetition of the process. All unnecessary pain should be scrupulously avoided, and care taken to leave as little of an unpleasant effect on the patient's mind and body as is consistent with the accomplishment of the object. For this reason, instruments should be kept as much out of sight and hearing as possible, and blood-stains be carefully removed from the vulva, for fear of exciting suspicion and alarm.

Whenever practicable a diagnosis should be made at the first examination; where this is impossible, as manifestly must occasionally occur, the patient should be told the reason, and a second or third interview solicited, until all doubts are removed. The diagnosis and, *eo ipso*, the treatment may depend on the result of a microscopic examination; or the fulness of the bladder or rectum, or the excitable condition of the patient may preclude an immediate diagnosis; or the imminence of the menstrual flux or the presence of perimetric inflammation counter-indicate the exploration of the uterus.

The most favorable time for an examination is, as a rule, about the middle of the intermenstrual period, and the time of day, one when the light is fair and the patient under as normal conditions as possible.

3. Positions for Examination.

The examination of the female genital organs may be undertaken in various positions: a, dorsal recumbent; b, lateral; c, latero-abdominal; d, abdominal; e, genu-pectoral; g, erect.

The preference for one or the other of these positions varies in different countries. Thus in England the left lateral decubitus is generally chosen both for digital and specular examination; the French and Germans prefer the dorsal position for finger and speculum; and we in this country employ a combination of both positions, making the digital examination on the back, and then turning the patient to the left latero-abdominal position for the application of the duck-bill speculum. The majority of practitioners, however, introduce the cylindrical and bivalve specula on the back.

It is frequently of the greatest diagnostical and therapeutical utility to examine a patient in different positions, reference to which will be made under the various heads.

In all the recumbent positions but the latero-abdominal, an ordinary couch, sofa, or bed can be made available; but for the examination in the latero-abdominal position a hard, perfectly level plane is essential. In all the positions, the nates should be brought down to the very edge of the couch, whenever practicable. In making a mere digital examination while the patient is in bed, this rule is, of course, generally disregarded.

a. *The Dorsal Recumbent Position.*

There are several subdivisions of the dorsal position which all possess their utlity and may come into play in any case. They are: the *level dorsal*, with head, shoulders, sacrum, and soles of feet on the same plane, thighs flexed nearly at right angles to abdomen; the *gluteo-dorsal*, with the thighs acutely flexed on the abdomen and the knees touching the thorax; the *lithotomy*, with the shoulders elevated, so as to approach the pelvis.

The *dorsal position, with legs extended*, I have not thought necessary to enumerate among the positions for a vaginal examination, as this procedure can only be very imperfectly performed in that position. The necessity for examining in that position will occur only in cases where absolute immobility of the body is imperative (as hemorrhage, violent peritonitis), or where the knees or hips are anchylosed. Under all other circumstances, no matter how inconvenient, the patient can at least flex the knees as in the regular position about to be described. The difference of position of the pelvis and sexual organs is seen by comparing figures 1 and 2.

For purposes of digital and bimanual examination the ordinary *level* dorsal position *with flexed knees* is the most convenient. Its employment by far the larger majority of gynecologists proves this statement. In it the pelvic and abdominal viscera are at rest, and occupy as nearly as possible a horizontal position, gravitating neither downward, nor laterally, nor upward; the diaphragm exercises a minimum of displacing power on the viscera; the abdominal wall is relaxed; and we have the pelvic organs in as nearly a state of quiescence as we can expect to find them. One of the great advantages of the dorsal position, next to the probability of

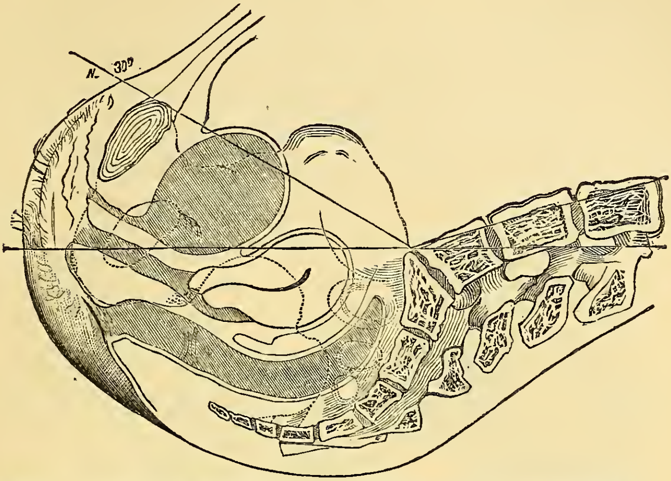

Fig. 1.—Dorsal recumbent position, with extended legs. (Hegar and Kaltenbach.)

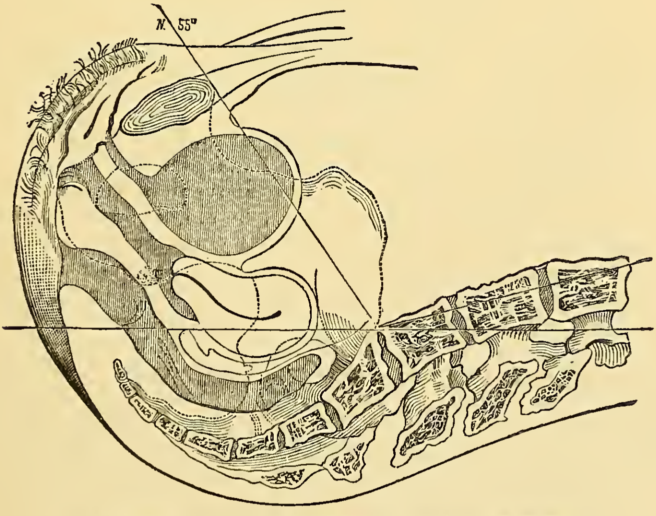

Fig. 2.—Dorsal position, with knees flexed. (Hegar and Kaltenbach.)

finding the pelvic organs in the most natural position, is the possibility of exercising abdominal palpation together with indagation.

The patient is placed on a flat, perfectly level couch, best a table, her head resting on a low pillar, her shoulders and sacrum on the same level, the nates close to the edge of the table, the feet close to and slightly external to the thighs, the knees widely separated. In case of need the knees may have to be kept asunder by assistants. In this position the pubis is the highest portion of the pelvis; it approaches the promontory of the sacrum, which rests on its middle portion; the vagina pursues a less horizontal, more downward direction, than in the flat dorsal (Fig. 1). The cervix is situated about on a line drawn through the tuberosities of the ischium.

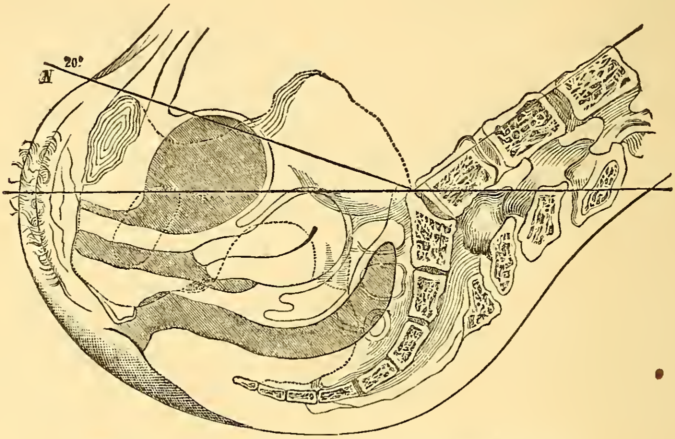

FIG. 3.—Dorsal position—lithotomy. (Hegar and Kaltenbach.)

Two lines drawn from the upper border of the symphysis and the posterior commissure of the vulva respectively, to the promontory of the sacrum, form an angle of fifty-five degrees.

In this position the abdominal parietes are more relaxed, and intra-abdominal pressure more reduced than in the flat dorsal.

This position is undoubtedly the most convenient and practical for all ordinary examinations and should always be employed whenever the necessary hard level couch is at hand. But it very frequently happens that we are obliged to examine patients in bed or on office-chairs, with head supported by pillows or cushions. The thorax is then approximated to the pelvis and a slightly different relation of angles between the symphysis, promontory, and lumbar vertebral column is established.

Intra-abdominal pressure is also somewhat increased, whence this position is inferior to that on a perfectly level plane. Any one who has endeavored to practise abdominal palpation when the thorax was somewhat elevated, as is usually the case in bed, will appreciate the difference. This position is rather more comfortable for the patient than any other, and in cases of no more than ordinary difficulty answers all purposes. The vagina has an almost horizontally backward direction, and the symphysis is elevated but slightly above the promontory.

These two positions suffice for all ordinary vaginal examinations. But cases are not uncommon in which the thickness or rigidity of the abdominal walls, the length of the vagina, or the rigidity of the perineum prevent a thorough examination. In such cases the dorsal position may be still further modified by putting the patient in the so-called *gluteo-dorsal* position (first systematically utilized by Simon), which consists in flexing the thighs of the patient to their utmost extent on her abdomen, so as to bring the knees almost in contact with the thorax, and separating the knees as widely as possible. The vulva should be at least at the edge of the table. Each leg is held by an assistant, who, if fatigued or desirous of using his hands for sponging or other assistance, may place the knee over his neck. In this position the sacrum is lifted from the couch, the body rests on the upper portion of the sacrum, the symphysis is greatly elevated, and the promontory correspondingly depressed, the angle between the two being increased to fifty-five or sixty degrees. The vagina takes an almost perpendicularly downward course, whereby the cervix is more easily reached per vaginam, and it, and the whole posterior surface of the uterus per rectum. The promontory also becomes more readily accessible to the vaginal finger, a fact worthy of remembrance in cases of prospective obstetric prognosis. The abdominal walls are greatly relaxed, intra-abdominal pressure much diminished, and palpation therefore facilitated. Still, care should be taken not to elevate the thorax, or overdo the pelvic elevation, as the crowding together of the abdominal viscera would annul the gain first obtained. The anterior wall of the vagina, being almost perpendicular, becomes more readily accessible, even up to the cervix, to the finger and eye, a discovery which Simon utilized for the operation of vesico-vaginal fistula which he always performed in this position. His method is chiefly practised in Germany, but in this country the latero-abdominal (Sims') position has answered all the desires of the operator, and is so much less laborious to the assistants that it is scarcely likely to be superseded.

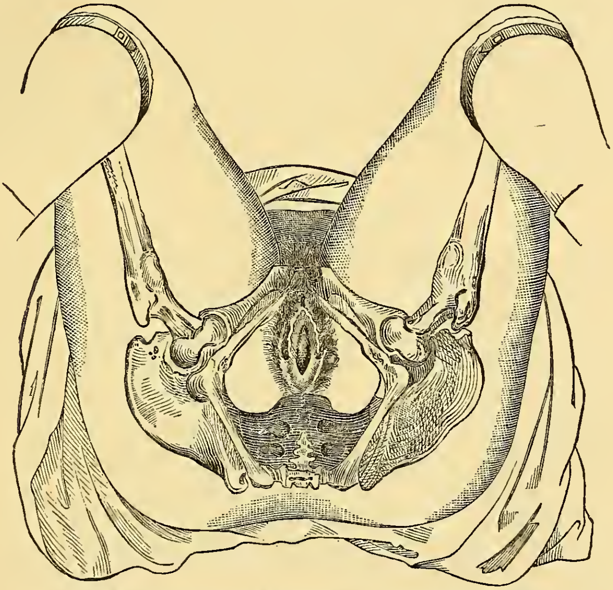

FIG. 4.—Gluteo-dorsal position, front view. (Hegar and Kaltenbach.)

Still, there are cases of very fleshy women, with large, flabby, or cicatricially distorted vaginæ, in whom the gluteo-dorsal position affords a better view of the field of operation than the semiprone.

As a rule, it is well to remember that whenever a difficulty is experienced in reaching the cervix or other pelvic organ, as frequently happens when the patient is in bed, the elevation of the pelvis, by increasing the flexion of the thighs on the abdomen (*i.e.*, by directing the patient to slip farther down in the bed, whereby the thoracic elevation is also diminished), or by putting the other hand or a cushion under the sacrum, will at once bring the desired part within reach.

Another dorsal position has recently been devised by Freund, of Strasburg, for his operation of abdominal extirpation of the entire cancerous uterus, and that is with the whole pelvis so much elevated as to swing free of the table, the knees being suspended in crutchlike supports fixed in the table; the body resting on the dorsal and cervical vertebræ. The object of this position is to gravitate the intestines away from the pelvis and thus freely expose that cavity.

For examination, I can imagine that it might be utilized for palpation in cases of small pelvic tumors with long pedicles, which were obscured by the superincumbent intestines; and also for the removal from the pelvic cavity of loose ascitic fluid simulating localized effusion or tumors. The stretching of the vaginal canal in this position would render it unfit for a digital examination.

b. *Lateral Position.*

The lateral position may be either right or left in accordance with the hand chosen for the examination. The left side is the one generally adopted, and the examination is made with the right hand. Barnes advises using the left hand, which to me appears inconvenient and awkward. Were I to use my left hand in examining on the side, I should prefer to have the patient on her right side. Examination on both sides may, moreover, occasionally be useful.

The patient lies on a horizontal plane, her head supported merely by a pillow; the hips down to the edge of the table; the thighs flexed at right angles to the body; the shoulders and hips perpendicular to the plane. In this position the pelvic organs maintain very much the same relations as on the back, but the movable abdominal viscera naturally incline toward the dependent side. The side position affords facilities for exploring the lateral and posterior portions of the pelvis (the right half of the pelvis being more accessible to the right index finger, on the left side, and the reverse), and may enable the examiner to detect a laterally prolapsed ovary, or slight perimetric exudation, or dislocated coccyx, which escaped his observation on the back. The lower portion of the rectum may also be examined by eversion from the vagina, or by the speculum.

Although bimanual examination is possible by passing the external hand between the thighs of the patient, it is obvious that it can neither be so convenient nor accurate as when the patient is on her back. The reason given by Barnes for preferring the left hand for indagation is that the right hand can be more *conveniently* (!) used for simultaneous abdominal palpation. The palpation of small abdominal tumors may be facilitated in the lateral position, by permitting the isolation of the tumor, if it be situated on the uppermost side, or its grasping between the fingers of one hand, if it be on the dependent side. Thus, in a case of double floating kidney, in a parous woman, I was able to grasp readily the kidney of the uppermost side, as it was extruded by voluntary expiratory pressure from below the ribs, when in the dorsal position it was almost impossible to isolate the organs. It is also useful in percussing for free ascitic fluid.

For the ordinary purposes of diagnosis (except, perhaps, mere local inspection), the straight lateral position, in my opinion, is decidedly inferior to the dorsal which, moreover, permits the use of either hand for indagation without change of position. It is also evident that whatever displacement of the pelvic organs possibly occurs on the side, is not usual to the patient, and can therefore but serve to confuse the diagnosis.

Nevertheless, the majority of English gynecologists persist in using the left lateral position both for indagation and examination with the cylindrical and bivalve speculum.

c. *Latero-abdominal Position.*

Next to the dorsal, the latero-abdominal, or semiprone, position, is unquestionably the most useful; not, however, for a digital examination, but for the employment of the speculum, and chiefly one particular speculum, the duck-bill of Sims.

A digital examination can, it is true, be performed, and the other varieties of specula introduced quite as successfully (and more advantageously, as will be shown hereafter) in this position as in the straight lateral; but it is chiefly for the exposure of the whole vaginal tract by the duck-bill that this position is useful.

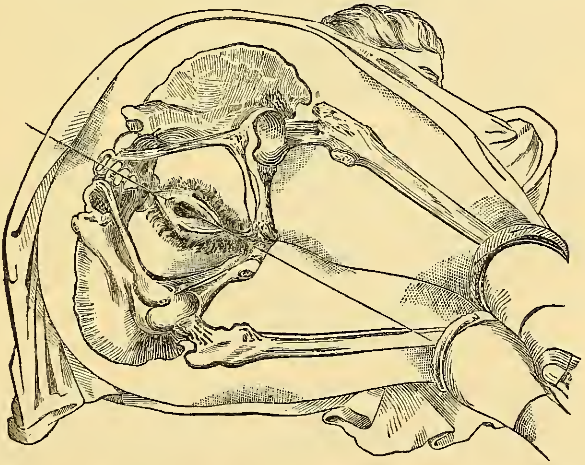

Fig. 5.—Latero abdominal (Sims') position. (Hegar and Kaltenbach.)

The patient lies on her side (right or left; the left is the one usually employed, and is recommended by the discoverer of this position, Sims, because the nurse can best hold the speculum with her right hand), on a perfectly flat, hard table, the head on a low pillow, the lower (we will take the left) shoulder and that half of the thorax touching the table, the other shoulder but slightly raised from it, the left arm thrown out behind and hanging over the edge of the table; the left hip touching the lower edge of the table, the right hip somewhat to the left in correspondence with the right shoulder, the thighs and knees flexed at right angles, the right knee slightly overlapping the left, the feet close together, projecting over the left corner of the table, and supported by the back of a chair or other article of furniture. In this position the woman lies partly on her side, and partly on her stomach, the abdominal viscera gravitate forward and downward away from the pelvic cavity; the pelvis has a lateral and downward inclination, so that a line drawn from the coccyx through the rima vulvæ will strike the right popliteal space. The posterior vaginal wall is thus superior to the anterior, and the uterus sinks downward and forward. Intra-abdominal pressure is, to a great extent, suspended. By admitting air into the vagina in this position a counter-pressure may be made to the intra-abdominal pressure, and any force still exerted by the latter entirely paralyzed.

For ocular examination this position is unrivalled, and for instrumental and operative measures to the vagina and cervix almost indispensable. Whenever Sims' position is mentioned in this work, the left semi-prone position is intended. While a hard table, merely covered with a blanket, or tightly upholstered, is undoubtedly the best couch for this position, and the examination is facilitated by giving the table a lateral and downward inclination toward the lower side and head of the patient, a tolerably satisfactory examination may be made on a firm, level sofa, or bed, which does not allow the hip to sink in to the level of the vulva. The table should be so placed that the light falls directly upon the vulva over the right shoulder of the operator; the table will therefore occupy a diagonal position before the window.

d. *Abdominal Position.*

This position is useful to the gynecologist only in so far as it enables him to examine the spinal column and the posterior aspect of the pelvis, for any abnormalities which may affect the diameters of the pelvis or the position of the internal genital organs.

e. *Genu-pectoral Position.*

The patient is placed on a hard, level couch, her head so turned as to rest on one side of the face on a low pillow, her shoulders and upper thorax directly touching the couch, her thighs at right angles to the pelvis, the knees and hips close to the edge of the table, the feet slightly projecting over the edge. In this position the body rests on the upper portion of the thorax and the knees, the pelvis being very much higher than the thorax.

The sacrum is then the highest point, its anterior surface looks downward and forward, the symphysis is but slightly lower than the promontory, but the downward inclination of the lumbar vertebral column is a very rapid one. The anterior wall of the vagina is nearly horizontal, the cervix uteri points toward the sacrum, the fundus downward and forward following the general direction of all the pelvic and abdominal viscera. Intra-abdominal pressure is entirely suspended, and if air enters the vagina by suction (as occurs with a gaping vulva), or is made to enter through a speculum, a positive counter-pressure or *vis a tergo* is added to the *vis a fronte* of gravitation and suspended intra-abdominal pressure. The vagina becomes elongated by the traction of the anteverted uterus, and if air enters is expanded like a balloon and every part becomes readily visible.

For purposes of digital examination this position is obviously unfitted through the elongation of the vagina already mentioned. It is mainly useful as a means of replacing a dislocated, chiefly, retrodisplaced uterus, especially if the fundus has become impacted in the sacral excavation and resists digital replacement on the side. The prolapsed uterus or ovaries, and small incarcerated fibroid or ovarian tumors with long pedicles, are also most easily replaced in this position, either spontaneously or by manual pressure.

To determine the length of the intravaginal portion of the cervix, this position is invaluable. A cervix which appears greatly elongated, even to the vulva, will be no longer than normal when examination (sounding, indagation, and inspection) is made in the knee-chest position. A peculiar, microscopically as yet unfathomed, ductile condition of the uterus is the cause of this phenomenon. In the dorsal or erect position the uterus draws out like putty ; in the knee-chest position gravitation causes it to shrink. It is important to make this experiment in supposed hypertrophic elongation of the cervix and in prolapsus uteri.

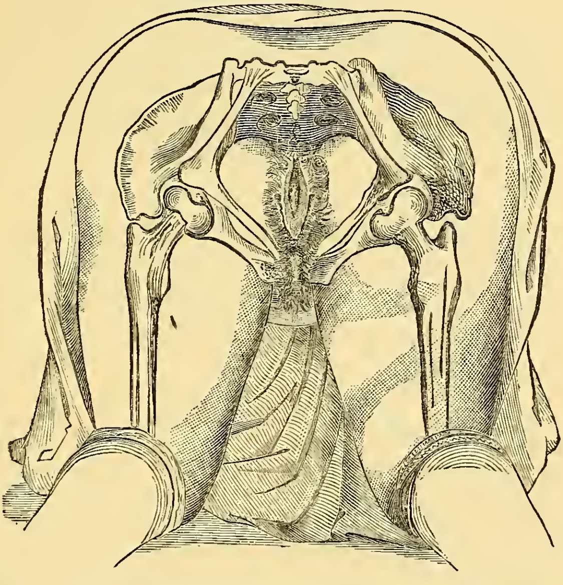

Fig. 6.—Genu-pectoral position—posterior view. (Hegar and Kaltenbach.)

Pessaries are also at times advantageously applied in this position, and applications of fluids made to the distended vagina. For operations the position is not generally available, as it is too uncomfortable to be long borne, and the administration of anesthetics is difficult, if not impossible in it.

Palpation is rarely attended with particular advantage in this position, since the weight of the abdominal walls on the palpating hand materially interferes with the perception of an intra-abdominal tumor. Still, occasionally the extent and manner of the downward displacement of the tumor may be detected by palpation and afford valuable information.

It is evident that the genu-*pectoral* position should not be confounded with its incomplete substitute, the genu-*cubital* position, in which the upper portion of the body rests on the elbows instead of the thorax, and the downward inclination of the vertebral column is very slight. The essentially beneficial influences of the former, gravitation and suspension of intra-abdominal pressure, are absent in the latter, and the genu-cubital position is useful only for the operation of certain cases of vesico-vaginal fistula which are not readily accessible in Sims' position. For these cases Bozeman has devised the apparatus represented in the accompanying cut.

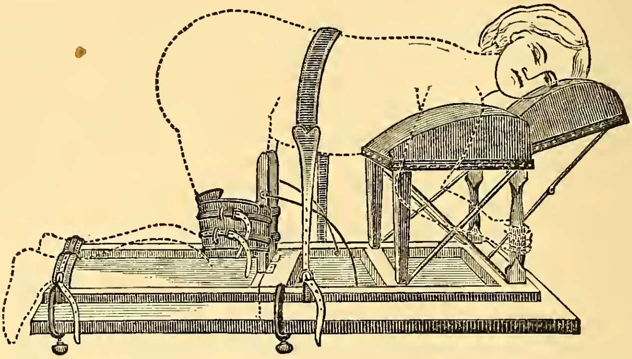

Fig. 7.—Bozeman's position and apparatus for vesico-vaginal fistula operations.

g. *The Erect Position.*

In the pelvis of a woman in the erect position the most dependent portion is the symphysis pubis, even the tip of the coccyx being slightly higher than the inferior border of the pubis. The promontory is situated at an angle of 55° above the crest of the symphysis. The vulva points downward and very slightly forward, the vagina pursues an upward and backward direction; the anterior vaginal wall is the first to meet the examining finger, the uterus has descended somewhat in the pelvis, the cervix generally backward, the fundus more than usually discernible through the anterior vaginal wall (this displacement occurs more markedly in parous women, though it is met with, to a slight degree, in nulliparæ); the anterior abdominal wall is tense and protrudes in a convex outline. In short, in accordance with the law of gravitation, involuntary intra-abdominal pressure is increased to its maximum. Deformities of the spinal column (particularly lordosis and kyphosis); excessive obliquity of the pelvis, whereby the promontory and symphysis are placed almost in a perpendicular line; relaxation or diastasis of the abdominal muscles, abdominal tumors, displacement of the uterus or vagina, will, of course, alter more or less the above relations.

Since the symptoms complained of by women suffering with uterine disease are usually most intense while the patients are on their feet, walking or standing, it is self-evident how important it is to ascertain the condition of the presumably diseased organs in that position. A digital (and even ocular) examination of the genitals is therefore important in many cases, particularly displacements, in order to ascertain the actual amount of displacement during standing, or the amount of support given by a pessary with the superincumbent weight of the abdominal viscera pressing upon it; or the persistence of the dislocation found in the recumbent position. Thus a retroversion on the back may be found an anteversion or simple descensus on the feet. Any imaginary objection on the part of the patient for esthetic reasons is readily overcome when the valuable information to be obtained by this examination in the erect posture is explained to her. I am under the impression that digital examination in this position is by no means as frequently employed in this country as it should be.

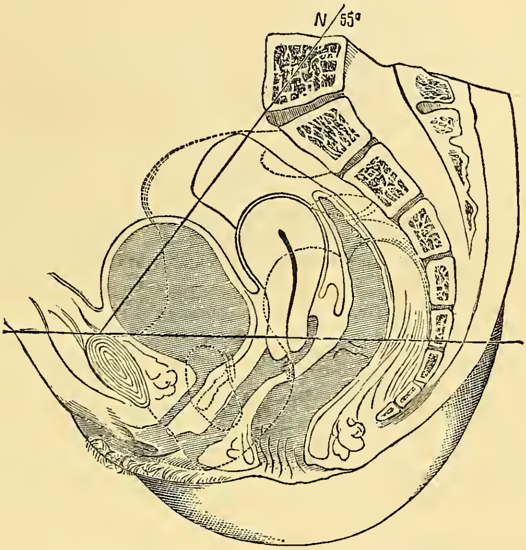

Fig. 8.—Erect position. (Hegar and Kaltenbach.)

4. Examination Couches.

The exigencies of practice require us to see many of our gynecological patients at their homes, and to examine them on any couch which happens to be convenient, generally a sofa, or a bed, which it is well to level by placing a lapboard or some hard board on it for the patient's pelvis to rest on. A contrivance which seems to me useful has been devised by Dr. Hugh Hamilton, of Harrisburgh, Pa., for the support of the pelvis and knees of a patient who is to be examined at her home. The accompanying cut explains the apparatus. The arms can be folded together for convenience of portability. A very fair examination may be made, and a correct diagnosis arrived at in this manner; but whenever the case presents unusual difficulties of diagnosis, or the examination entails the use of the duck-bill speculum, it should be undertaken on a proper level table or high couch, with all the necessary conveniences and assistance. The feebleness of the patient may require this to be done at her home; but the physician should impress upon those of his patients who are able to walk, the advantage to himself as regards convenience, and therefore to themselves as regards freedom from discomfort and pain, of having the examination made at his office. For like reasons, all subsequent treatment which does not require rest in bed should also be administered at the office.

The specialist will always examine his office patients on a table prepared for the purpose, while the general practitioner more frequently makes use of an adjustable examining-chair, of which there are various patterns, the best being, in our estimation, that of Wilson. The disadvantage of these chairs is that, while they are very useful for digital, bimanual, and ordinary specular examinations, their immovable side-arms render them unfit for the use of the duck-bill speculum. The specialist therefore, in this country at least, is always provided with an office table, particularly constructed for the use of this speculum, without which modern gynecology can scarcely be efficiently practised. Any ordinary strong level table 4′ by 2½′, and 3′ high, with about 2″ of the legs at the head-end sawed off, will do for this purpose; indeed, in case of need, the examination can be made on a lounge or bed, when, however, difficulty is generally found in securing good light,

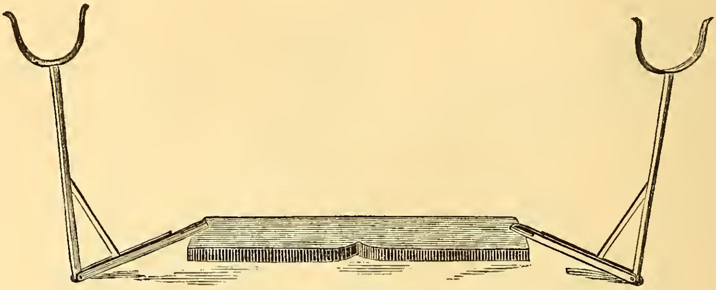

FIG. 9.—Hamilton's gynapod.

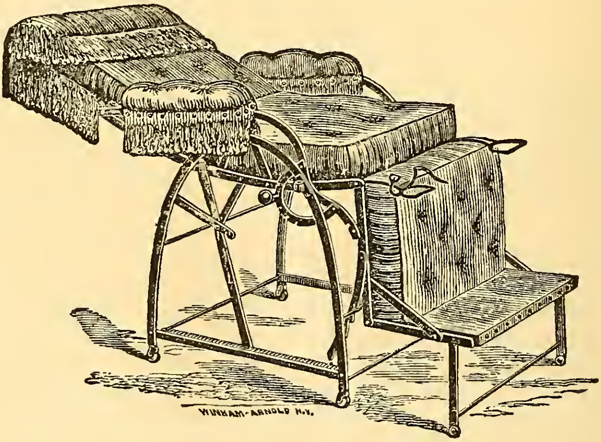
WINHAM-ARNOLD N.Y.

FIG. 10.—Wilson's adjustable chair.

and the lowness of the couch is very uncomfortable to the physician. The specialist will find it worth his while to procure the best possible arrangement for his peculiar practice, and this is undoubtedly a firmly upholstered table of the following description: It is 42″ long, 27″ wide, 32″ high at the foot, 29″ at the head, sloping three inches from foot to head. It has a removable headpiece and sidepiece to prevent the patient from sliding from the table. The table has a double top, the upper padded one being capable of being raised at the left side of the table, by a lever to a height of 4″, the right border moving on hinges. In this way the abdomen gets, besides the constant downward dip of 3″ built into the table, an optional lateral dip of 4″, whereby the abdominal viscera are still further thrown to the dependent left side of the patient. At the foot-end are two sliding boards, the left one provided with a movable padded block for the feet to rest upon, and, with the block tipped down, for the left foot in examinations on the back; and the right one for the right foot in the same position. These slides have sockets cut into them for the heels of the patient's shoes. At the foot of the table is a long drawer for instruments and fluid-bottles; at the head-end any desired number of drawers may be attached, arranged to suit the fancy of the owner. The patient mounts on the table by means of a small stepladder or footstool, and the physician sits at the foot-end on a round (piano-) stool. The footstool may contain a basin, or be utilized for cotton, tampons, or waste scraps.

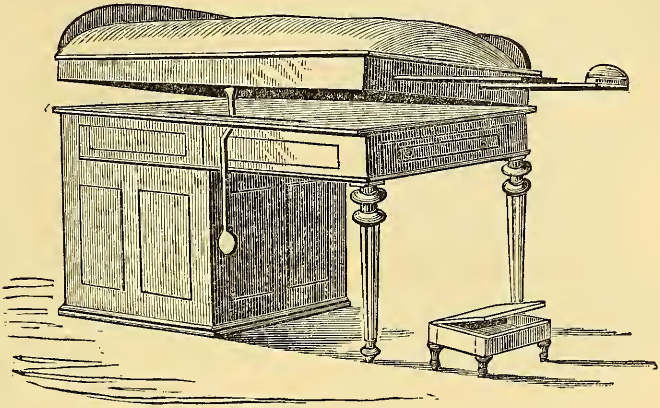

FIG. 11.—Goodell's examining-table.

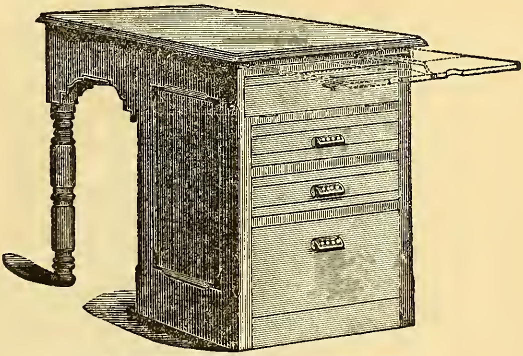

FIG. 12.—Chadwick's examining table.

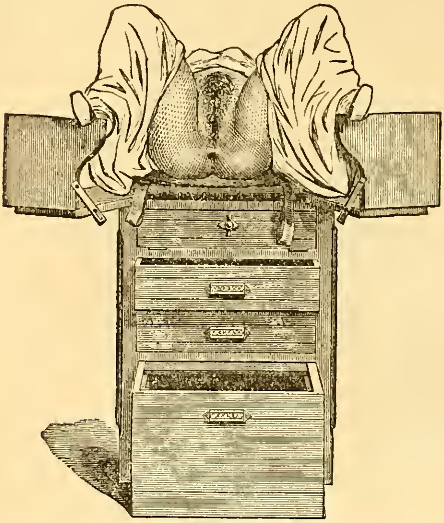

Fig. 13.—Chadwick's examining-table with patient in front view.

The table which I have here described is one used by Dr. Goodell and modified after one of Dr. M. D. Mann, who had the idea from Dr. T. G. Thomas, who to my knowledge was the first to have a table of this pattern constructed. I myself had one made after Dr. Thomas's pattern, with a slight difference in the arrangement of the drawers, and have used it constantly, and with the greatest satisfaction for the past five years. This table can be made by any ordinary cabinetmaker or carpenter, neatly upholstered in leather, at from thirty to forty dollars. A cheaper and less elaborate table of this pattern is that of Dr. S. W. Francis, of Newport, R. I., shown in Fig. 15. To each top are attached two serrated arms, by which the tops can be raised as high as the arms will permit, being prevented from falling by ratchets which catch under the teeth. To lower either, it is necessary only to pull upon the handle, which is attached to a cord connected with an escapement on that side. It is made to order by Caswell, Hazard & Co., of New York. Another very practical and ornamental examining-table is that devised by Dr. James R. Chadwick of Boston, and sold by Codman & Shurtleff of that city for forty-

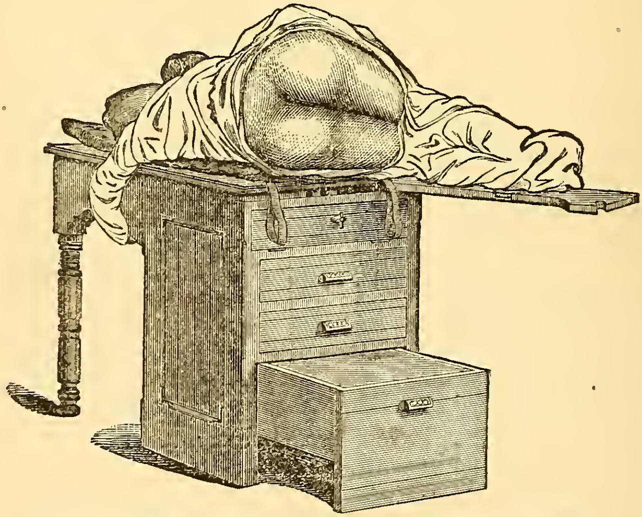

Fig. 14.—Chadwick's examining-table with patient in Sims' position.

five dollars. The accompanying cuts sufficiently explain its construction. It does not possess the lateral and longitudinal obliquity, the former of which is of inestimable value in enabling the physician to dispense with the services of a nurse to hold the speculum; the lateral pitch tips the viscera so far forward and downward that, on retracting the perineum with the speculum, and admitting air into the vagina, the anterior vaginal wall is so ballooned out as to render a depressor unnecessary; the physician therefore has his right hand free for other work.

The objection has been made against these tables that their appearance is alarming and repulsive to the patient, who hesitates to mount on a table which looks to many of them like what one of my patients delights in calling it, a "rack." Besides, it is objected that they are not as neat looking as an adjustable chair, and show what they are intended for. As regards the latter objection, it may be answered that the office of a physician is not a lady's boudoir; and as for a lady's refusing to mount the table, I have never found more than a momentary hesitation on being confronted with it behind the screen, with which most gynecologists hide their instruments of torture; and I am quite confident that no woman, however refined or capricious, will care whether it is a table or a chair on which she has to place herself, at the request of her trusted physician, when once she has made up her mind to an examination. Of course, the physician can do much by his manner (as already stated) to mitigate the unpleasantness of the ordeal.

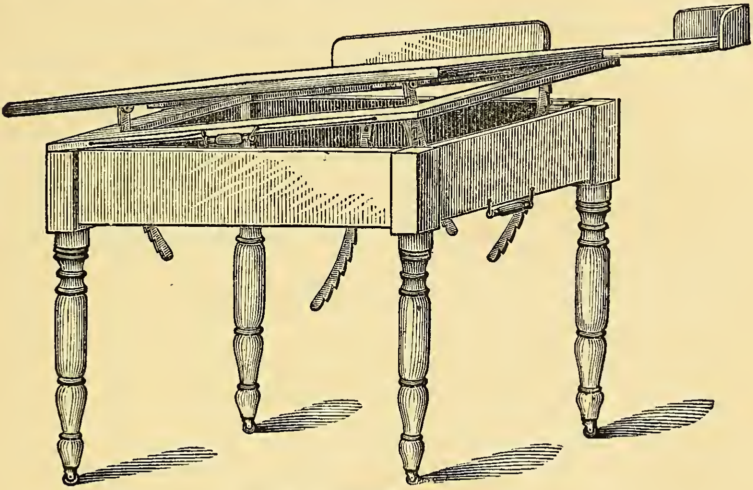

Fig. 15.—Francis' examining-table.

For operations an ordinary flat table of the size first mentioned, covered by a quilt and sheet, answers every purpose.

4. Examination without Instruments.

A. *Inspection.*

When a gynecological patient presents herself for diagnosis and treatment, it is incumbent on us, after taking her general history and symptoms, to ascertain what information ocular inspection—general and local—of her person will give us.

A glance at her figure will tell us whether she is tall or short, lean or stout, well-built or misshapen. The expression and color of her face will show whether she is in apparently good general health, or whether she is anemic (chlorotic), plethoric, or cachectic; the expression of her eyes, and her manners, may tell us her peculiar temperament. Her tongue and gums will inform us to some extent of the condition of her digestive organs, and the quality of her blood. Even through the clothes we can detect any unusual prominence of the abdomen; and it may be useful to note the amount of her mammary development.

On placing the patient in the dorsal position, if there be anything in the symptoms calling for an inspection of the breasts and abdomen, the clothing is loosened about the waist, and the abdomen laid bare, the flexed lower extremities being covered by a sheet, as well as the face, if the patient desires it. The breasts are then exposed, their size and firmness, the color of the areolæ and nipples, presence or absence of the small glandular nodules, known as Montgomery's follicles (the unusual development of which is, unless lactation be performed, strong evidence of pregnancy), noticed. Proceeding to the abdomen, its distention, shape, color; the hue of the linea alba; the prominence of the umbilicus; the presence or absence of irregular pink or white striæ, and of a separation of the recti muscles, are all signs to be observed by the eye. Peculiar motions of the abdominal wall due to the movements of a child in the uterus, or the peristaltic action of the distended intestines, or contractions of the abdominal muscles, or the pulsations of the abdominal aorta, may also be visible if the walls are thin. The presence of the striæ above-mentioned was formerly attributed to laceration of the corium of the skin by its distention; recently Dr. Busey, of Washington, has advanced the view that they are due to the obliteration of lymph-spaces and atrophy of adipose tissue in the corium. They, by no means, prove the presence or previous existence of pregnancy (for they are wanting in ten per cent.), and merely show the occurrence of a certain amount of distention of the skin from any cause; they are found not only in the skin of the abdomen, but also in that of the breasts, thighs, and gluteal region, in women with strongly developed adipose tissue.

Inspection of the abdomen may further show us, by the peculiar discoloration or cicatrization of certain portions, whether blisters, leeches, tincture of iodine, hot poultices, or cupping, have been employed, and thus give a hint as to previous affections of the patient. The distended urinary bladder may also be visible.

The appearance of the lower limbs, their straightness, the presence of varicose veins, or of present or previous disease, is also worth a glance.

While it is necessary to inspect the remainder of the body only when the history renders it desirable to do so, it is always advisable, in my opinion, to subject the external genital organs of every female who comes to us for disease of the sexual system to a careful ocular examination before proceeding to the first internal examination. The practice of a gynecologist is rarely confined to women of the higher classes, and even among them, unexpected forms of disease of the external genitals are occasionally found; in the lower classes, the physician has to fear the presence of specific or parasitic contagion (pediculi pubis), which it is his duty to himself to guard against. Irrespective of this precaution, the information obtained by an inspection of the vulva and vaginal orifice is often of the greatest importance.

The examination may be made in the dorsal position, the patient being covered by a sheet, or on the side. I have never found a patient object, provided the mistake was not made to ask her permission. If the inspection is made as a matter of course, in a quiet, delicate manner, it is completed almost before the patient is aware of it.

The points to notice are: the situation of the vulva whether normal, or too far back; the color and size of the labia; the condition of the mons veneris (absence of pediculi); the presence of intertrigo of the thighs; the length of the perineum; the presence of hemorrhoids; the adaptation of the labia, or gaping of the vulvar orifice; the size of the clitoris; the presence of ulcers, or eruptions (follicular, chancroid, or hard chancre, mucous patches, or epithelioma), on the vulva or perineum; the protrusion of a portion of the vaginal wall; the presence of varicose veins, or edema of the labia. On gently separating the labia with the fingers of either hand, the introitus vaginæ is exposed to view, and its color, whether normal, pale pink, or red, eroded, and inflamed; the presence of a prolapse of the anterior or posterior wall of the vagina; the presence, shape, or absence of the hymen; the evidence of coition or parturition (lacerated hymen for coition; effacement of the shreds of the hymen, rupture of the fourchette for parturition); presence and character of the vaginal discharge; swelling of the Bartholinian glands; the appearance of the meatus urinarius; presence of caruncles—are all visible. In women whose vulvo-vaginal tissues have become relaxed from imperfect puerperal involution or pluriparity, the vulva frequently gaps so much as to afford a view some distance into the vagina on merely separating the labia with the fingers, and I have even exposed the cervix in this manner. In such cases, the mere spreading open of the thighs, in the dorsal position, causes the vulva to gap. Occasionally inspection will reveal to us a prolapsus uteri or vaginæ, or a hernia, of which the patient had made no mention.

Two small tubular glands in the urethra, which open at either side of the meatus, have lately been discovered by Dr. Skene. If inflamed they give rise to a very obstinate urethral discharge which can be cured only by slitting up the tubules and cauterizing them. In this condition their orifices are to be seen as two minute yellow spots at either side of the meatus.

An inspection of the secretions oozing from the vagina, or removed on the examining finger, is of great importance, and may reveal the nature of the disease. The secretions from the vaginal and the endocervical mucous membranes differ essentially in character and appearance; the vaginal being creamy, thin, or purulent, and of acid odor; that from the cervix thick, stringy, glairy, or discolored, and inodorous. A creamy vaginal discharge is usually a chronic symptom, and depends on venous hyperemia or general anemia; greenish, sanious, offensive discharge leads to the suspicion of an acute hyperemia or venereal infection; a putrid, shreddy secretion, speaks for malignant disease. The expulsion of clots, so often spoken of by patients, as a matter of importance in describing the character of their menstrual discharge, means merely the retention of the blood in the vagina until it had time to coagulate, and is a symptom of no special importance whatever. The physician should always be cautious about diagnosing a venereal infection—a gonorrhea—merely from the character of the discharge. He should remember that his decision implicates another besides his patient, and that he may be called upon to prove the correctness of his view in a court of law.

B. *Auscultation and Percussion.*

It is manifest that *auscultation* can but rarely be of service to us in gynecological practice. But, as many cases of pregnancy come into the hands of the gynecologist for diagnosis of that condition, it is obvious that abdominal auscultation should never be omitted when there is the least prospect of the patient's being in advanced pregnancy. But there are other conditions in which auscultation may be useful; such as tumors, in which the ear may detect the presence of large arteries by the systolic thrill spreading from, or the murmur occurring in them; or the existence of peritoneal roughness and adhesions by a friction sound; or the presence of an aneurism; or the presence of loose ascitic fluid, by its splashing sound on sudden change of position of the patient. In suppurating ovarian cysts with decomposed contents, the presence of air in the sac may be detected by a succussion sound. The pulsations of the abdominal aorta are readily audible, and may be distinguished from the fetal heart by being synchronous with the radial pulse.

Percussion has a far wider range of utility; indeed, it is indispensable in the diagnosis of abdominal tumors. As for auscultation, the patient should be in the recumbent dorsal position, with thighs flexed, the clothing about the waist loosened and drawn down, and the abdomen bared. By means of percussion, the extent of a tumor may be detected by its area of dulness; or the interposition of intestines between the tumor and abdominal wall, evidently of great importance during ovariotomy, and also valuable as a means of diagnosis between ovarian tumors (in which the uniform dulness shows that the intestines have been pushed to the sides and behind the tumor), and renal or splenic growths (in which intestinal tympanitic sound is usually found at some spot of the anterior abdominal wall). Besides, for tumors of the uterus and ovaries, percussion is useful in locating and defining plastic exudations into the cellular tissue of the broad ligaments, and into the peritoneal cavity. A change in quality of the percussion sound on altering the position of the patient will show the presence of a movable mass or free fluid in the abdominal cavity.

Percussion is applicable directly to the genital organs only in case of vaginal enterocele, labial hernia, or the suspicion of the presence of intestines in a prolapsed uterus and vagina.

Auscultation may be practised either with the stethoscope or directly by placing the ear to the abdomen; percussion may likewise be made with the plessimeter or the fingers. Habit and preference will decide in favor of either. I usually prefer the direct methods.

C. *Abdominal Palpation.*

Palpation is by far the most important method of examining abdominal tumors, very many of which without it would practically be unrecognizable. It requires a great amount of exercise and practice, and even most competent operators have been misled by their sense of touch in diagnosing abdominal tumors. The differential diagnosis between multilocular ovarian cysts and fibrocysts of the uterus, for instance, is often absolutely impossible, and a pregnant uterus has been taken for either of these tumors, or ascites mistaken for an ovarian cyst by physicians of the highest eminence.

Of course, it is not necessary to palpate every case of genital disease. In such cases in which it appears desirable, the patient should be placed in the dorsal position, which will produce the greatest possible relaxation of the abdominal walls and the minimum of intra-abdominal pressure. Such a position would be that described as the gluteo-dorsal; but as this position is uncomfortable and unpleasant to the patient, it is advisable to try the ordinary flat dorsal position with sharply flexed and but slightly separated thighs first. The clothes should be drawn down to the symphysis, and the abdomen completely bared, as in inspection, auscultation, and percussion, which, indeed, should generally precede palpation. There are other positions in which palpation is practicable, such as the erect, lateral, genu-pectoral, but they are used chiefly to ascertain the mobility or change of position of a tumor, and are attended with the difficulties which the increased abdominal pressure entails in the erect posture, and the weight of the abdominal walls and viscera in the genu-pectoral position. In some instances the latter proves useful in dislodging a tumor or the uterus from the pelvic brim, and making it accessible to the palpating hand.

The patient being prepared in the ordinary dorsal position with recently evacuated bladder and rectum, the physician steps to her side and places his warmed and soft hands gently on the abdomen, using only the tips of the four fingers for palpation. Proceeding with a pawing motion he explores region after region of the abdomen, preferably following a regular routine in order not to overlook any portion. Thus he may first palpate the supra-umbilical portion, then proceed to the umbilical, hypogastric and the inguino-ovarian regions. The supra-umbilical portions are palpated with the finger-tips pointing upward, the median parts with the finger-tips pressing backward toward the vertebral column, and the infra-

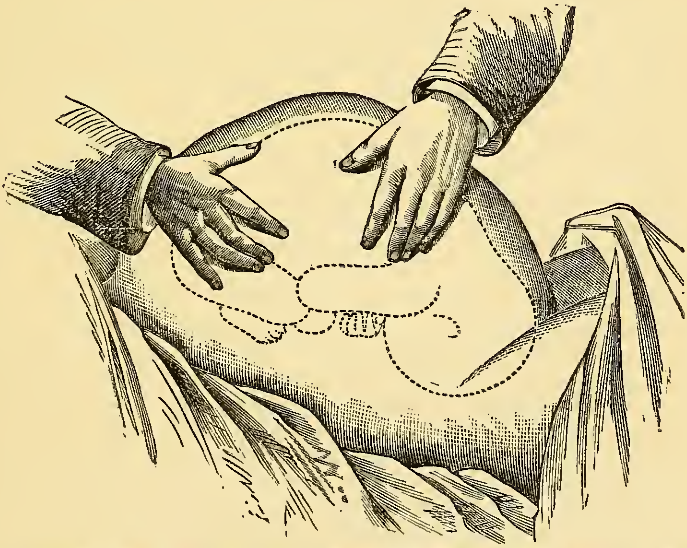

FIG. 16.—Manner of using hands in abdominal palpation. (From Mundé's "Obstetric Palpation.")

umbilical regions with the tips pointing downward into the pelvic cavity. Thus region after region is explored, and any abnormality carefully mapped out and traced. A great obstacle to palpation is the voluntary resistance of the patient by contraction of her abdominal muscles. This may be overcome by diverting the patient's attention, letting her open her mouth, or take a deep inspiration and make a correspondingly long expiration, during which latter the abdominal viscera and wall follow the receding diaphragm, and the fingers can be rapidly thrust inward. Filling the bladder and rectum with water and rapidly withdrawing it will, according to Hegar and Kaltenbach, produce immediate relaxation of the abdominal walls. In cases of absolute impossibility to secure relaxation, palpation under anesthesia may become necessary, unless the physician would run the risk of making an utterly wrong diagnosis. Tumors of apparently undoubted existence often miraculously disappear under an anesthetic. Thus, I remember a consultation case of supposed extra-uterine fetation with apparently distinct lateral tumor (the uterus being found normal per vaginam) in an excessively hyperesthetic patient, where the tumor had entirely disappeared when the examination was repeated under ether. Patients differ very greatly in their amenability to palpation; in nervous, hysterical women and young girls the practice will generally be found very difficult, often impossible, for frequently they are absolutely incapable of controlling their will.

Another obstacle of scarcely less frequency is adiposity of the abdominal wall. This naturally cannot be overcome. Another, still, is tenderness and inflammation of the abdominal or pelvic viscera, which may often be annulled by gentleness and persuasion. Another is the existence of free fluid in the abdominal cavity, which may require removal before palpation is practicable.

Irrespective of the advantage of gentleness in palpation as regards the avoidance of exciting reflex or voluntary abdominal contractions, or exciting pain, it is advisable to use great caution in palpating the abdomen in order to avoid bruising delicate or inflamed structures, tearing adhesions or rupturing cysts. The latter has repeatedly been done in the case of small ovarian cysts.

In a favorable case with thin, flaccid abdominal walls, the palpating fingers can readily touch the lumbar vertebræ, the sacral promontory, the abdominal aorta, the pelvic brim, and the fundus uteri. The presence of a tumor or swelling of any kind in the regions named would, therefore, be easily detected. Besides, the inguinal regions, the crural and inguinal canals should be palpated for enlarged glands or hernial sacs. But in the majority of cases the fingers can only enter deeply enough to feel the indistinct resistance offered by the intestines, and can but suspect the fundus uteri by its greater firmness. It is, therefore, not so much for the detection of small intrapelvic growths that palpation is useful, as for the recognition and tracing out of large tumors, arising either from the uterus, ovaries, kidneys, liver, spleen, or other abdominal viscera.

There are several normal conditions which on superficial observation might easily be mistaken for pathological growths. Such are first of all the pregnant uterus; then, the distended urinary bladder; further, the overloaded rectum. So long as the fetus has not attained a palpable size, the existence of pregnancy can be detected by palpation only by the rational signs, and the uniform spherical enlargement, and elastic feel of the uterus. When once the separate members of the fetus are recognizable by abdominal touch, the differentiation of pregnancy is evidently easy.

There are, however, cases in which differentiation is exceedingly difficult; and competent observers, even of the highest rank, have repeatedly mistaken a pregnant uterus for an ovarian tumor, or have overlooked the coexistence of both conditions. Only experience and careful attention to the details of examination will guard against such errors.

The distended bladder can scarcely be overlooked if the precaution, always to be taken before proceeding to palpation of securing voluntary or instrumental micturition immediately beforehand, is adhered to. The dull percussion sound, central situation, uniform ovoid outline, and absence of depression between the tumor and the symphysis, should direct attention to the bladder. I once saw a case in which such a central, ovoid, tense tumor, of the size of an adult head, appeared quite suddenly above the pubis, and, the catheter showing the absence of urine in the bladder, the diagnosis remained doubtful, until the discharge of a large quantity of fetid pus per rectum, and disappearance of the tumor, showed it to be one of those rare cases of perityphlitic abscess, in which the pus points downward and toward the median line.

An accumulation of fecal matter in the large intestine if small in amount will escape detection by palpation, unless the abdominal walls are very thin and lax. If the accumulation increases, it may be recognized at first as a soft, pultaceous, displaceable mass of greater or lesser magnitude, later as hard nodules or lumps. If situated in the sigmoid flexure, the mass might be taken for a coil of intestines matted together by peritonitic exudation, particularly if there be tenderness in the left iliac region. Occasionally the coprostasis attains such dimensions as to be mistaken for a semisolid ovarian tumor, as happened in a case in the Julius Hospital in Würzburg during my service at the Maternity there, and in another in the practice of Dr. Sears, of New York. The free evacuation of the bowels would obviously clear up the case at once, but unfortunately in these cases of coprostasis that is precisely the most difficult thing to obtain.

Tumors situated in the anterior abdominal wall between the sheath of the muscles and the peritoneum are distinguished with the greatest difficulty from intraperitoneal growths. Only by the possibility of making the fingers of each hand meet behind the tumor can its extraperitoneal origin be assured. Plastic exudations in the subperitoneal cellular tissue in either iliac fossa are very easily accessible to palpation and percussion, which would not be the case if the exudation were in the true pelvis. Retroperitoneal tumors may be palpated from the side, or by grasping the whole lumbar region of one side in one or both hands; if the abdominal tumor is movable and simulates a floating kidney, the diagnosis may be affirmed or corrected by feeling for the kidney in its normal position in the manner indicated. Retroperitoneal tumors are only palpable through the anterior abdominal wall, when they have attained considerable size. As a rule, it may be assumed that tumors growing from the pelvis spread upward and remain connected with their place of origin so as to have no interruption in their continuity. *Per contra*, tumors growing downward from the superior abdominal organs (kidney, spleen, liver, stomach) generally leave a sulcus between their lower border and the symphysis pubis, and do not reach down into the true pelvis until they have attained enormous size. Exceptions to this rule may occur in comparatively small pelvic tumors with long thin pedicles, which permit the growths to rise out of the pelvis to the extent of the pedicle, thus leaving a depression above the symphysis; and in supra-abdominal tumors with long pedicles, which allow their descent into the pelvis. In some cases the laxity of the abdominal walls will permit the fingers of both hands to be pressed in so deeply as almost to meet behind the tumor, and clearly feel the relations of its attachment. In one such case (of complete diastasis of the abdominal muscles) the covering was so thin as to show the tortuous vessels of the tumor through the skin; the fingers could distinctly grasp the slender pedicle underneath the tumor and feel it arising from beside the uterus, the fundus of which was also palpable. A diagnosis of cyst of the left ovary was made by myself and other gynecologists, but the operation proved the tumor to be a cyst of the mesentery, and the thin pedicle to have been small intestine. In another case where I had positively diagnosed a multilocular ovarian cyst, and had practised electrolytic puncture with the result of contracting and solidifying the growth, the consequent separation of the lower border of the tumor from the symphysis induced several of our most prominent gynecologists to pronounce it a renal or splenic tumor, but not ovarian. The operation, performed by one of these gentlemen, showed an almost solid tumor of the ovary of the size of an adult head, attached by a long pedicle to the left broad ligament.

The peculiar feel of the surface and substance of a tumor to the palpating fingers is a valuable aid in diagnosing its nature and contents. Thus we have a smooth, uniform, elastic contour, with the sensation of a wavy motion imparted by one hand striking the abdomen on one side to the hand on the other side, and we think of a large cyst with fluid contents and moderately thin walls; or, we feel a hard, dense, nodular mass, with here and there large protuberances, and no evidence of fluctuation, and the chances seem in favor of subperitoneal uterine fibroid; or, we feel a doughy, fleshy, irregular surface, which is slightly impressible but scarcely elastic, and we think of a semisolid ovarian tumor, or a uterine fibrocyst. The degrees of firmness and softness of tumors are so exceedingly variable that it is impossible to define them; besides, the sense of touch differs in different individuals. Only long practice can enable a correct discrimination between the more delicate shades of resistance of different tissues. Between the two extremes of the pulpy softness of a half-filled ovarian cyst (after tapping) and the stony hardness of a calcified fibroid or lithopedion, there are innumerable degrees of consistence.

A sensation of gradual hardening on palpation suggests the presence of contractile muscular fibre (enlarged uterus), and thus affords an aid to diagnosis.

The sensation of fluctuation is probably the most difficult of all to recognize in doubtful cases. When one hand strikes or pushes one side of the abdomen, and the palm of the other hand applied to the other side feels a distinct impulse, like a wave of fluid striking against it, there can be but little doubt of the presence of fluid. So, also, when this wave is felt at a certain distance, and is imperceptible somewhat farther off, can we assume the presence of a partition or septum dividing the cyst into two or more compartments. But to detect the presence of deep-seated fluid in an abdominal tumor, by the sensation of fluctuation, requires a great amount of practice, and has baffled even the most expert. A soft, vascular, succulent myoma may (like a subcutaneous lipoma), convey a precisely similar impulse to that of fluid. Errors may also be committed by mistaking the elasticity of an adipose abdominal wall for fluctuation.

A peculiar boggy, doughy feel of a tumor may suggest deepseated fluid, but a positive opinion on this point should be guarded.

The existence of fluid having been determined by fluctuation, it is important to ascertain whether this fluid is inclosed in a sac or is loose in the peritoneal cavity. By noting the absence or presence of changes in the seat and area of fluctuation in different positions of the patient, this point may generally be settled. Still, I have seen an eminent European surgeon, assisted by a no less eminent gynecologist, open an abdominal cavity for undoubted ovarian cyst, and find only free ascitic fluid.

If we rapidly press in the abdominal wall and then as quickly relax the pressure, we may, in certain cases, meet with a sudden momentary resistance, like that of a solid body floating in fluid. This is the ballottement so familiar to obstetricians in connection with the movable head or breech of the fetus in utero. It is chiefly met with in gynecology in cases of pediculated subperitoneal fibroids of the uterus, which float upon the intestines as in water. Small solid ovarian tumors may give the same sensation. I recently met with a case in my service at Maternity Hospital, in which a pediculated fibroid at the fundus uteri was mistaken by the junior assistants for a ballotting fetal head, and one head presenting, the case therefore supposed to be one of twins.

The thickness of a fluid may, to a certain extent, be estimated by the rapidity and distinctness of the wave of fluctuation; the more rapid the wave, the thinner the fluid. However, the tension of the cyst or abdominal wall may give greater impetus to the wave, and thus deceive the examiner.

A change of position of the patient may, by altering the situation and relations of the tumor, aid in settling the diagnosis. Thus, palpation in the side or kneebreast position may, by displacing the tumor upward and laterally, give access to its until then obscure attachments.

Tenderness of the abdominal wall is a great obstacle to palpation, and at the same time a valuable suggestion as to the diagnosis. The touching of a tender spot will lead us to examine that region more carefully, and may result in the discovery of a localized peritonitis or cellulitis, an ovaritis or a hyperesthetic uterus. It may, also, if met with on the surface of a fibroid or ovarian tumor, lead us to suspect more or less acute peritonitis (therefore future adhesions), at that spot.

D. *Digital Examination.*

The introduction of the finger—generally the index, occasionally also the middle, and rarely the whole hand—into one of the pelvic apertures of the female vagina, rectum, and (so far as the index or little finger alone are concerned), the bladder, enables us to explore the cavity of the true pelvis, and to touch certain portions of the organs therein contained. If access were denied us to these cavities, as for instance in cases of combined atresia vaginæ and rectal stricture, the other means of exploring the pelvic organs already described would manifestly be of very little service. A digital examination of the immovable structures of the pelvic cavity (the vagina, rectum, bladder, cellular tissue) is the best means (excepting only the eye) of exploring these parts; but so far as the movable pelvic organs (the uterus, ovaries, tubes and broad ligaments) are concerned, the intrapelvic finger alone can give but limited information. It touches the cervix, perhaps a prolapsed ovary or inflamed broad ligament, but the fundus uteri is accessible to the rectal and vaginal touch only when displaced, and the other organs can be but vaguely suspected. Even the finger in the bladder finds movable, floating bodies before it in the fundus uteri and the ovaries. Therefore, an essential and indispensable part of a thorough digital examination of the pelvic organs is the simultaneous systematic palpation of the abdomen, whereby the movable organs are steadied and crowded down against the internal finger. Simple digital examination alone, through one or more of the external pelvic outlets, is admissible only when there is a counter-indication to palpation (tenderness, or peritoneal inflammation, resistance on the part of the patient, necessity for haste), or when the examination is merely made as a supplement to previous thorough explorations.

An examination may be made simultaneously with different fingers of the same or the other hand through the vagina and rectum, the vagina and bladder, and the rectum and bladder.

In selecting the passage, through which the examination is to be made, two rules should be observed: 1, to choose the canal which leads most directly to the organ to be examined, and through which the latter is most accessible; and 2, to select that passage which will be least repugnant, painful, or dangerous, to the patient. Of the three canals, the vagina is obviously the most convenient and the one through its constant patency best fitted by nature for the purpose. The examination per rectum is always repugnant to a patient's feelings, certainly not pleasant to the physician (a circumstance not to be considered, however), and generally more or less painful. The exploration of the bladder with the finger requires previous instrumental dilatation of the urethra, and should therefore be considered in the light of an operation to be practised only under anesthesia. Only when the vaginal exploration fails in giving the desired information, should the rectal touch be employed; and not until these two and all other means fail, should the vesical touch be resorted to.

Topographically, the cervix uteri, the recto- and vesico-vaginal septa, the vaginal roof, and the para-uterine cellular tissue are best felt through the vagina ; the retro-uterine space, Douglas' pouch, the posterior uterine surface, the sacral excavation and the sacro-ischiatic notches, through the rectum ; and the ante-uterine peritoneal excavation and cellular tissue, and anterior surface and fundus of the uterus through the bladder. The aid of simultaneous abdominal palpation will, however, generally enable us to dispense with a vesical examination at least.

When the vagina is closed to the finger, a combined digital examination of the rectum and the bladder may become necessary, and has given valuable diagnostic information in congenital atresia of the vagina and doubtful presence of uterus and ovaries, and important therapeutical results in chronic inversion of the uterus.

As a rule, but one finger should be employed in examining the pelvic passages ; occasionally, if the vagina is very long or capacious, the index and middle finger may be introduced ; but it is very rarely necessary to insert more than one finger into the rectum, and never but one into the bladder.

a. *Vaginal Touch.*

The vaginal touch may be practised either in the erect, the dorsal, or lateral recumbent, or the knee, breast, or elbow position. Each of these positions may present particular advantages for indagation, but for the large majority of cases the dorsal recumbent is the most convenient.

The introduction of the finger into the vagina naturally presupposes the patency of the orifice of that canal. The most common obstacle to the finger is the hymen, the imperforation of which requires the division of the septum by the knife. As a rule, the normal aperture of the hymen is sufficiently large, and the membrane so elastic as to permit the gentle, gradual introduction of the finger. In case of excessive rigidity, its gradual dilatation by the finger at the risk of rupturing it, or nicking it with the knife, are justifiable measures, if the examination is imperative. Not infrequently a resistance to the finger may arise from spasmodic contraction of the constrictor muscle of the introitus vaginæ, due either to fear, nervousness, erosion of the orifice, or reflex spasm (vaginismus) ; or large flabby nymphæ, tumors of the labia majora or clitoris, excess of crinial development, may interfere entirely or temporarily with indagation. Or a contraction of the levator ani muscle, or excessive rugosity of the vagina, may arrest the finger after it has passed the introitus.

In cases where the obstacle depends on the voluntary (although unintentional) resistance of the patient, or where it is due to excessive local irritability, and that resistance cannot be overcome by persuasion, an examination under anesthesia is necessary. Occasionally, sufficient local anesthesia may be produced by vaginal suppositories containing opium and belladonna, or iodoform, to enable us to dispense with a general anesthetic.

The previous introduction of astringents by means of injections, tampons, or suppositories, may also contract the vagina so much as to interfere with indagation, and should not mislead the examiner as to the nature of the obstacle.

As a rule, a vaginal examination should give no absolute pain. Only in pathological conditions (inflammation, erosion, ulceration, hyperesthesia, chronic pelvic infiltrations) will the gentle touching of the vulvovaginal canal and its surroundings give rise to pain. Not uncommon causes of pain on introducing the finger are caruncles of the urinary meatus, and hyperesthetic remains of the hymen.

The physician should accustom himself to examine with either hand. The patient may be so situated in bed that only one hand is available, or one hand may be temporarily disabled. Besides, certain portions of the pelvis are more readily touched with one index than the other ; thus, the left side of the pelvis and its contents, are more easily reached with the left forefinger, the right side of the pelvis and its contents, with the right.

If one hand is to have the preference for indagation, it should decidedly be the left, as most men are more dexterous with the right hand in palpation, sounding, and other instrumental manipulations.

The index finger, in the vast majority of cases, suffices perfectly for indagation. In large, patulous vaginæ, or where it is desired to reach very high, the middle finger may also be introduced, but I think the fancied advantage of higher reach is counterbalanced by the confusion of the tactile sense of the two fingers, and the discomfort to the patient. It is rare that a forefinger is physically too short to enable it alone to make a thorough vaginal examination ; and I have generally seen such supposed short fingers grow longer in proportion to the increased experience of their possessors. A practised examiner will usually feel all there is to feel with one finger ; the beginner can do no more with two than one. The middle finger alone, which I have seen used by some, is manifestly much less convenient than the index, and only serviceable in the absence of the latter.

If there is a discharge from the vagina, which possibly may originate in the uterus, it is advisable to introduce the speculum, preferably the cylindrical, before making a digital examination, in order not to interfere with the secretion from the cervix. By indagation, and especially sounding, this discharge may be disturbed or removed, and a valuable point for diagnosis thus lost.

Dorsal position.—The patient is placed flat on her back, in the position indicated, the hips well down to the edge of the couch or table (which should be on a level with the pelvis of the physician), the knees and thighs bent and abducted, the feet flat on the couch at the side of the hips. The hips should be on a level with the head, perhaps even a little higher.

The rectum has been emptied within several hours, and her bladder immediately before. The face and body of the patient are covered with a thin sheet, which protects her modesty and prevents her from seeing what is being done. The physician washes his hands carefully, removes all impurities from underneath his nails, and searches for any abrasion on his index fingers, the nails of which should be cut close and smoothly pared and rounded. He then anoints the forefinger to be used with some greasy substance. In private practice vaseline is probably the neatest article for the purpose; in hospital and dispensary practice I use common brown soap dissolved in warm water; to this a little glycerine may be added, if desired. Any non-irritant fatty substance may be used, such as sweet-oil, glycerine, lard, sweet butter, cold cream; but, as a rule, the liquid substances are inferior, as they drop from the finger on the clothes or floor, and less effectually protect the finger. These substances may be carbolized or thymolized by the addition of one or two grains of carbolic acid or thymol to the ounce, but this is not necessary. The thymol, however, makes a very pleasant deodorizer.

Before introducing his finger it is advisable for the physician now, if this is the first examination, to inspect the vulva and introitus vaginæ, by lifting the clothes and stepping to one side to admit the light. Having surveyed the vulva by drawing apart the labia majora with finger and thumb of one hand, or the fingers of both hands, he gently separates the nymphæ and exposes to view the meatus urinarius, the vestibule, the vaginal orifice. Having completed the inspection (the reasons for and advantages of which have already been enumerated under the respective head), indagation is performed in the following manner:

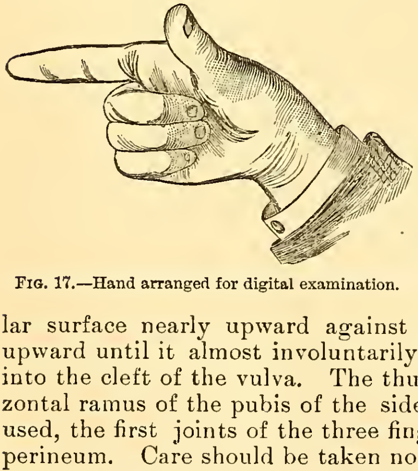

FIG. 17.—Hand arranged for digital examination.

The physician anoints the respective index finger, folds the three last fingers of the same hand as tightly into the palm as possible, abducts the thumb, and standing between the thighs of the patient, slightly toward the thigh corresponding to the examining hand, places the index finger with the volar surface nearly upward against the perineum, and passes it gently upward until it almost involuntarily slips over the posterior commissure into the cleft of the vulva. The thumb is placed gently against the horizontal ramus of the pubis of the side corresponding in name to the hand used, the first joints of the three fingers are pressed against the yielding perineum. Care should be taken not to give pain by a ring, if one is worn on the examining hand. As the finger slips through the vulvar cleft into the orifice of the vagina, it notes the condition of the perineum, its integrity or laceration; the patulousness of the vulvar aperture; the rigidity or flabbiness of the tissues; the moisture or dryness, and the sensitiveness of the parts; the situation, anterior or posterior, of the orifice; the height and thickness of the symphysis pubis. The meatus urinarius may also be touched, if there be any vesical symptoms, and its patulousness and tenderness noted; and the finger may even approach the clitoris, if an ocular inspection has not satisfied the physician about these organs. But, as a rule, it is best not to touch the clitoris, especially in nervous, excitable women, who may develop erotic symptoms embarrassing to themselves and the medical attendant.

The finger is now passed through the vaginal orifice into the canal of the vagina itself, noting, as it advances, the hymen or myrtiform caruncles; the condition of the vulvo-vaginal glands (whether swollen or not); the presence or absence of protrusion of the anterior or posterior vaginal wall; the moisture, and proceeding upward, the width, length, rugosity, or smoothness of the vaginal canal. The tension of the perineal and levator ani muscles, the distance between the tubera ischii, the rigidity or prominence of the sacro-ischiatic ligaments, and the mobility of the coccyx, are further points to be considered. Commencing immediately under the symphysic arch and extending an inch upward to lose itself gradually in the anterior wall of the vagina is a welt, often of the thickness of the little finger, the urethra. The relations and sensitiveness of this prominence, especially at the point where it ceases, are of importance. The separation of the rami of the pubic arch may also be valuable information in prospective obstetric cases. To survey all these points is but the work of a moment for a practised finger.

About two-thirds of the way up the vagina, between two and three inches from the orifice, the finger meets with a more or less conical projection, the cervix uteri, in the centre of which is an opening, the external os. The fingers should be swept over the cervix and note its consistency and shape; the size of the os, the condition of its lips or edge, whether smooth, regular, fissured, hard or soft; the presence of a rent in one or both lips; the existence of small nodules over its surface (the ovula Nabothi), the rolling out or eversion of the cervical mucous membrane. The direction in which the os points should further be observed, whether downward, backward, upward, forward, or lateral; also the mobility of the cervix. Having examined this part thoroughly, the finger sweeps around it and touches, one after the other, the anterior, posterior, and lateral pouches of the roof of the vagina. First, the point of reflexion of the vagina on the cervix is noted, whereby the length of the intravaginal portion of the cervix is ascertained. It will be observed that the vaginal reflection posteriorly is at least one-half an inch higher than anteriorly.
The finger is then passed before the cervix and pushed upward with a view to feeling for any firm body, the fundus uteri, which will be found there, if the uterus is antedisplaced; in that case, the finger seeks for an angle between the cervix and the fundus at about the vaginal insertion, and by its presence diagnoses an anteflexion, by its absence an anteversion. The tenderness and mobility of the fundus are also tested. Passing behind the cervix, the finger searches for the like firm body which it vainly sought for in front, and if found, seeks the same angle. The degree of the angle should be noted, and in either case, the ease with which the finger reaches the anterior or posterior body, remembered as indicating the degree of displacement. The sensitiveness and mobility of the

posterior body are of greater importance than the anterior, owing to the frequency of adhesions between the fundus uteri and the retro-uterine peritoneal pouch and of tumors in that locality. The posterior vaginal pouch is further to be examined for small movable masses, which may be either prolapsed ovaries, or scybala in the rectum, or pediculated retro-uterine fibroids. Whenever a tumor is felt adjacent to the uterus, the finger should endeavor to ascertain whether and to what extent it is connected with the uterus. Further, the parametrium should be carefully examined for irregularities, nodosities and tender spots, which are very common and evidences of more or less acute or chronic cellulitis. The elasticity, impressibility, and depth of the vaginal roof is also a highly valuable criterion as to the presence or absence of pelvic peritonitis or its residues. A soft, ropelike swelling, extending from the middle of the posterior wall of the vagina up toward the left along the sacral excavation, should not be mistaken for a neoplasm; it is the rectum, and can be detected by its moderate mobility in the upper portion, by its want of tenderness and the frequent presence in it of a soft pultaceous mass, or hard, movable scybala. The normally situated, not enlarged ovaries and tubes, can seldom be felt by the vaginal touch alone.

Before withdrawing the finger the mobility of the cervix is tested, and care taken to observe whether the cervix returns to its original, or remains in some other position.

It should be remembered that by depressing the elbow and gently but steadily pushing up the perineum with the three folded fingers, the depth of penetration may be increased by at least an inch. If the patient's pelvis is raised by herself or on a cushion, the posterior portion of the pelvic cavity is still more approximated to the examining finger, and the sacral promontory may even be reached, if the antero-posterior diameter of the brim is the least shortened, a point of decided importance if the patient should prove to be pregnant. On withdrawing the fingers, the color, odor, and character of the secretion covering it should be noted, as already mentioned under Inspection.

Dr. Eugene C. Gehrung, of St. Louis, describes an improved method of vaginal touch, to be used when the ordinary touch fails, which consists in introducing two fingers, and exaggerating the already existing position with one finger while the other explores the anterior or posterior vaginal fornix, as the case may be. By thus pushing the cervix backward in an antedisplacement, the anterior surface of the uterus is approximated to the finger against the anterior vaginal wall; in retrodisplacement, the cervix is elevated toward the symphysis and the other finger more readily reaches the posterior uterine wall in the posterior cul-de-sac. The ovaries, broad ligaments, and Fallopian tubes are also brought nearer to the finger by this method.

Starting from without inward, certain peculiar features in the different sections of the accessible genital tract may be met with and will denote corresponding physical conditions. Thus at the *vulva*, enlarged pendulous, highly pigmented nymphæ may lead to a suspicion of onanism if found in young girls, of excessive sexual indulgence or frequent parturition in married women; a highly sensitive, perhaps enlarged, or excoriated clitoris indicates a nervous, erotic temperament or onanism; erosions on the labia majora, pruritus vulvæ, or the presence of parasites, or, if flat and elevated, either specific patches or folliculitis, the diagnosis between which is not always easy; a laceration of the fourchette or perineum, an obliteration of the caruncles of the hymen speak for preceding parturition, a gaping patulous vulvo-vaginal orifice for pluriparity. An intact hymen with sharp, unbroken, spherical or crescentic border generally proves virginity; still, this test is not absolute, since, on the one hand, the membrane may be so elastic as to permit the introduction of the penis without rupturing, and, on the other, it may have been torn or destroyed by treatment or disease. Ordinarily, a hymen torn in one or several places down to its attachment, but capable of being restored to its normal shape by the adaptation of its folds, denotes defloration without parturition. An imperforate and bulging vaginal orifice would speak for retention of menstrual fluid.

A patulous enlarged urinary meatus may be due to artificial dilatation for diagnostic purposes, or if the dilatation be excessive, it may arise from the habitual use of that canal for the sexual act. Small bright red bodies projecting from the meatus (hyperplastic papillæ, caruncles) generally speak for painful and frequent micturition. A red eroded tender vaginal orifice leads to the suspicion of onanism or excessive sexual indulgence, or an irritating vaginal discharge.

Passing into the *vagina*, a protrusion of the anterior or posterior wall of that canal shows previous parturition with subsequent subinvolution of the distended vagina; a rough, nutmeg-grater-like feel of the vaginal surface shows the presence of a hyperemia or hyperplasia of the vaginal papillæ, or granular vaginitis; a very moist slippery condition of the passage speaks for hypersecretion, perhaps also from the cervical canal. Adhesions between cervix and vagina, and cicatricial contraction of the *vagina* are evidences of adhesive vaginitis, either of puerperal origin, or in consequence of acute specific infection, or of the application of strong acid and caustics. Tense bands, running backward or laterally from the cervix beneath the vaginal wall, are signs of old para-uterine cellulitis.

A long, conical pointed *cervix*, or a cervix curled up anteriorly with the os pointing upward, or a minute, "pinhole" os, are generally signs of congenital sterility; a cicatricially contracted, rigid os of acquired sterility (caustics). A small, round, or transverse os, with smooth lips denotes nulliparity; a gaping, fissured os, with irregular, notched lips, often admitting the point of the finger, pluriparity. A patulous external os is, however, met with also in nulliparæ, during chronic endotrachelitis, and after the use of cervical dilators (tents) and recent abortion. The excessive moisture and softness of the part will then be noticeable. On the other hand, a small, transverse os may occasionally be met with in women who bore one or more children many years previously, without the orifice sustaining injury at the labor. An excessive softness, pulpiness of the whole cervix may be due to pregnancy, as indeed, may a hypersecretion and puffiness of the vagina and labia. A fissure of the cervix, either unilateral or bilateral, of greater or lesser depth, merely indicates that the patient was delivered of a child, near or at term, but by no means necessarily implies that the labor was instrumental, or that the medical attendant was to blame for the laceration. The lips of the fissured cervix may be almost in apposition, or they may be rolled out "like the cut tops of a celery-stalk" (Goodell) with everted and eroded cervical mucous membrane. The surface of the cervix may be smooth, or it may be irregular, nodular, as though lentils or small peas were distributed under its

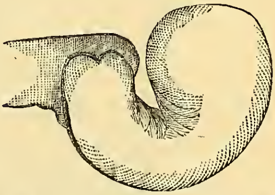

FIG. 18.—Retroversion of anteflexed uterus.

covering; the latter condition is due to the presence of small retention cysts, the occluded muciparous follicles (or ovula Nabothi of the old anatomists) from which the peculiar glairy mucus of the cervix is derived. (See Fig. 121.) Occasionally this nodular condition, particularly if associated with simple papillary hyperplasia, may become so excessive as to simulate epithelioma. Scarification of the nodules (if follicles, a glairy fluid exudes and they collapse) and the microscope soon settle the diagnosis.

A hard, almost cartilaginous, enlarged cervix may be merely the product of hyperplasia, or of caustics applied to a lacerated and everted mucous membrane; or it may be the first stage of scirrhous disease. The microscope will decide. A puffy, moderately hard, nodular cervix, enlarged to twice its size or more, with the enlargement generally extending above the vaginal reflection, means the first stage of parenchymatous cancer; a soft, readily bleeding, cauliflower-like growth of large size is an epithelioma; a crater-shaped excavation of the immovable cervix permitting the finger to enter almost to the os internum, with irregular edges and nodular swellings imbedded in the vaginal wall, is the second or ulcerative stage of carcinoma: all these, when once felt, can scarcely be mistaken.

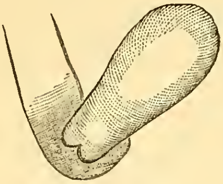

FIG. 19.—Anteversion of uterus.

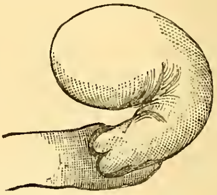

FIG. 20.—Anteflexion of uterus.

If the cervix and os are pointed backward toward the sacral excavation, it is probable that the fundus is to be found in the opposite direction; if the cervix is felt under the symphysis, the finger will feel the fundus in the posterior cul-de-sac. There is an exception to this last rule, and that is when the whole uterus is pushed forward and upward by a retro-uterine tumor; the uterus is then generally straight, and the fundus inaccessible by the vaginal touch. In flexions of the uterus, the cervix often retains almost the normal position, with the os pointing downward, slightly forward or backward; the finger detects the angle at the anterior or posterior vaginal insertion, which settles the diagnosis between flexion and version.

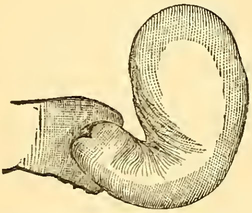

FIG. 21.—Anteflexion of cervix.

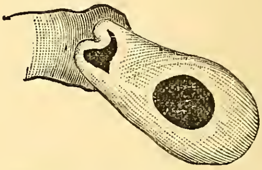

FIG. 22.—Retroversion of uterus.

A deviation of the cervix toward one or the other wall of the pelvis generally means a corresponding deviation of the fundus toward the other side, a right or left latero-version. Such latero-versions usually depend on contracting adhesions in the broad ligament, which draw either the cervix (generally) or the fundus toward the affected side. Occasionally the fundus is found on the same side as the cervix, and the uterus is either straight or latero-flexed; this condition is usually congenital.

Passing the finger into the *vaginal fornix*, the solid body usually felt in front of the cervix is the fundus uteri. Tumors are rare in this locality; seldom an enlarged and ante-prolapsed ovary, more commonly a uterine fibroid, an ante-uterine hematocele or cellulitic exudation. The bladder is ordinarily not recognizable to the finger; only when it is distended or hypertrophied (as in cystitis) does it impart an elastic resistance to the finger.

In the posterior fornix the finger meets with various tumors of different nature and origin, which often require the utmost ingenuity to decipher. The most common of all is the retroverted or retroflexed uterine body, next a subperitoneal uterine fibroid, a small ovarian tumor, a cellulitic or peritonitic exudation tumor, a hematocele, most rare a pelvic echinococcus tumor, sacral carcinoma, or exostosis. The differential diagnosis between these various growths is often exceedingly difficult to the vaginal touch, especially when a diffuse pelvic cellulitis has fixed an ordinarily movable tumor. As a rule, the fundus uteri is soft, elastic, oblong, tender; a fibroid hard and elastic, perhaps nodular; an ovarian tumor, also soft, elastic, more spherical and slightly tender; a cellulitic exudation or hematocele, when recent, soft, doughy, impressible, very tender ; when older, board-hard, dense, scarcely sensitive. The fundus, fibroid, and ovarian tumor are movable, together with the uterus, unless they be adherent. A pelvic exudation tumor or hematocele is absolutely immovable. If the retro-cervical tumor is movable, the finger may gradually push it up and its relations become entirely altered. Thus, recently, a retro-uterine tumor, which first appeared like a retroflexed fundus, but was readily discovered not to be such when the fundus was felt anteriorly by palpation, was diagnosed as a subperitoneal fibroid, until it was pushed up by repeated touching and finally showed its origin in the left broad ligament, namely, an ovarian tumor.

Another mass frequently felt behind the uterus is the loaded rectum, with its pultaceous or scybalous contents, which are recognized by the impressibility of the tumor and the number of the scybala. A retro-uterine tumor, for which I have repeatedly seen beginners take scybala, is the prolapsed, and slightly enlarged, ovary. A flat, movable, tender body, of the size of an almond or small fig, is felt directly behind the cervix, often at the very bottom of Douglas' pouch, on a level with the external os, or two such bodies may be found slightly to each side of the median line. If these bodies are flat and but little enlarged, they are tender only on severe pressure; but if enlarged, they are generally exquisitely tender. These bodies can be taken for nothing but the ovaries ; they are often so movable as to require two fingers to catch and hold them.

In each lateral pouch the finger in normal cases feels merely a soft elastic resistance. A very frequent sensation in that region is a moderately firm, smooth, often convex tumor, which is more or less tender, and at times has a doughy, boggy feel, giving evidence of deep-seated suppuration. Or the tumor may be hard, or freely fluctuating. This is a cellulitis between the layers of the broad ligament and latero-uterine connective tissue. If the tumor feels shrunken, hard, and is devoid of tenderness, it is not of recent origin. Irregular, flat, more or less tender nodules are often felt in different parts of the retro-lateral pelvic connective tissue, which are the residue of, often unsuspected, cellulitis in former years.

Lateral and latero-abdominal position.—The physician, standing slightly behind the patient, introduces the index finger of the hand opposite to the side on which the patient is lying (left side, right hand; right side, left hand) into the vagina with the palmar surface directed backward. The finger may be slipped over the fourchette, as in the dorsal position, or backward from the clitoris, and its introduction will be facilitated by lifting the superior buttock, and thus separating the labia, with the other hand. If the orifice be sufficiently large, two fingers may be introduced in this position, and will, I have found, be much more serviceable now than in the dorsal position, since they enable the examiner to explore also the lower half of the pelvic cavity, and to reach farther up by retracting the perineum. The chief advantage of indagation in this position is the possibility of touching the upper portion of the pelvic cavity (that corresponding in name to the examining hand), and the sacral excavation more readily than in the dorsal position. Thus prolapsed ovaries and posterior and lateral plastic exudations are often more easily felt in the lateral position.

The semiprone position offers no advantages over the lateral for indagation; on the contrary, the uterus and its movable adnexa are removed from the finger by gravitation in the former position. This very fact may, however, occasionally be useful by showing the mobility of the normal organs or of intrapelvic tumors, and thus aid in settling a diagnosis. Anomalies of the coccyx and sacrum are also more easily diagnosed in the lateral decubitus. The majority of gynecologists use the hand opposed in name to the lateral decubitus, as above described; and it requires but a trial to convince any one that anatomically this is the most convenient and useful hand for the purpose. Still, so prominent a gynecologist as Barnes recommends using the *left* index finger in the *left* lateral position. To me this practice is extremely awkward and inconvenient, for I can only feel the lower half of the pelvic cavity with the sensitive volar surface of the finger, and am compelled to turn and twist my hand, in the most uncomfortable fashion, to reach the posterior and upper portions of the cavity. To recommend the left lateral position and the left hand for ordinary vaginal examination seems to me merely laying unnecessary difficulties in the way of the student without the least compensating advantage.

The knee-chest or elbow position is not convenient for a digital examination, as the gravitation of the viscera away from the pelvis elongates the vagina so much as to render the cervix and vaginal vault less accessible to the finger than in the dorsal position. Only when it is desirable to ascertain the mobility or attachment of certain intrapelvic tumors will secondary knee-breast indagation occasionally prove serviceable.

Erect position.—The physician kneels on one knee, that corresponding to the examining hand being preferable, or (what I prefer) sits on a chair with his body bent forward; the patient stands before him, with separated thighs and slightly inclined body, steadying herself with one hand on the shoulder of the physician or the back of his chair, or he may support her by grasping her corresponding hip with his free hand; or she needs no support whatever. Introducing his hand under the clothes, which the patient herself may hold, he easily passes his forefinger into the, in this position, generally gaping, vulvo-vaginal orifice, or, the usual rule of slipping forward from the perineum may be observed; and then, the relations between the hand and vulva being the same as in the dorsal position, seeks the cervix, which will generally be found lower in this posture. The influence of the erect position and the thereby increased intra-abdominal pressure on the movable pelvic organs has been explained under that position, and it is therefore evident that the cervix, vaginal roof, and ovaries in the normal state, and still more in relaxed conditions, and movable tumors of these organs, are then more accessible to the finger. It is, therefore, advisable always to examine patients, in whom a downward displacement of the uterus or vagina is suspected, in this position and thus ascertain the extreme existing displacement. After the adjustment of pessaries for any form of uterine or vaginal displacement the amount of support afforded by the instrument can best be ascertained by examining the patient in the erect posture, and directing her to increase the intra-abdominal pressure by straining. In case of haste, or when it is merely desired to ascertain whether a pessary introduced some time before is still in place and doing well, this posture may further be employed as less laborious and lengthy for physician and patient. The tension of the vaginal roof in this position will, as a rule, prevent the finger from pushing up that septum, as can be done in the dorsal position. Displacements, both anterior and posterior, and also flexions, of the uterus, are aggravated by the erect posture, although in a less measure than the various degrees of prolapsus.

b. *Rectal Touch.*

A digital examination per rectum may be required when an obstruction exists to the introduction of the finger into the vagina (imperforate hymen, atresia or stenosis vaginæ, vulvar and vaginal tumors), or when it is desired to control the results of a vaginal exploration, or when the patient complains of pain during defecation or of any symptom referable to the rectum. Attention should in every case be paid to the rectum, in order that concealed disease of that organ may not be overlooked, but generally a visual examination will suffice, unless special reasons call for more. The special advantage of a rectal examination is the greater accessibility of the retro-uterine organs and the posterior wall of the uterus. This advantage is particularly available in ascertaining the extent and attachment of retro-uterine tumors and cellulitic exudations.

Emmet examines every patient who consults him the first time, through the rectum, and claims that he can touch the broad ligaments and all the retro-lateral uterine tissues so well in this manner that he often discovers small cellulo-peritonitic exudations, adhesions, and contractions, of which the history and symptoms gave no idea, but which accounted for many displacements, distortions, and obscure complaints, the cause of which would otherwise have been a mystery, and the treatment correspondingly vague.

Before examining the rectum, several precautions should be employed: 1. The bowel should be thoroughly evacuated and cleansed by means of injections shortly previous to the examination. 2. The space under the nail of the examining finger should be filled with soap, to prevent the introduction of fecal or other matter under the nail. 3. If the finger is withdrawn from the vagina to be immediately inserted into the rectum, it should be cleansed and freshly anointed, in order to avoid contamination of the delicate mucous membrane of the rectum by the vaginal secretion.

These precautions having been observed, the finger, well anointed, is gently introduced into the rectum. The resistance of the external sphincter is usually overcome without difficulty or pain. As a rule, it is not advisable to tell the patient what is about to be done (the directions for cleansing the rectum should be given before every appointed vaginal exploration), but anticipate any objection she may make by at once introducing the finger into the rectum. As the finger passes the sphincter, notice should be taken of pain experienced or hemorrhoidal tumors felt, which may require subsequent inspection. The first object the finger meets is a thick, conical body projecting into the anterior wall, the cervix uteri, which through the rectum appears nearer and is more easily reached, and gives the impression of being larger than per vaginam. Passing up behind the cervix the finger examines the posterior wall of the uterus, and the intervening pouch of Douglas; thence proceeds to touch the posterior wall of the rectum, and the surface of the sacral excavation. Strictures, polypi, cancerous degeneration of the rectum, and affections of the retro-uterine pelvic tissues are thus easily recognized. Great assistance is afforded this examination, by seizing the cervix per vaginam with a vulsella, drawing it down as far as practicable, and at the same time exploring the posterior uterine surface with the finger in the rectum. This maneuvre is particularly valuable in deciding the attachment of retro-uterine tumors.

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As a rule, one finger suffices for a rectal examination. The introduction of two will usually give pain and probably be of no particular service.

The *recto-vaginal touch* is a combination of the two methods. It consists in introducing the index finger into the vagina and the thumb of the same hand into the rectum; or the thumb into the vagina and the index into the rectum; or the index into the vagina and the middle finger into the rectum. Between the two fingers the recto-vaginal septum and the bottom of Douglas' pouch can be thoroughly touched, the finger in the vagina controlling the observations of the one in the rectum, and *vice versâ*. The utility of this method is evidently limited by the length and mobility of the fingers.

Should the sphincter be so irritable as to deny admittance to the finger, the examination may have to be made under anesthesia, and perhaps the sphincter forcibly dilated. This is always the case when Simon's method, the *introduction of the whole hand into the rectum*, is to be employed. This method was first demonstrated and elaborated by the late Prof. Simon, of Heidelberg, and consists in gradually passing finger after finger through the sphincter, until the whole hand is introduced; the hand is then carried up gently through the wide rectal pouch, to the narrower entrance of the sigmoid flexure, through which the points of the fingers project. The movable intestine can now be carried upward without thrusting the hand through the narrow part of the gut, and the lower portion of the abdominal cavity readily palpated. I myself have felt the kidneys, and reached to the umbilicus in this manner. There is, generally, if the hand be of moderate size (not larger than twenty centimetres in circumference at the knuckles), no injury done to the sphincter other than a few nicks, and incontinentia alvi seldom lasts more than a few days. The utility of this method in settling the differential diagnosis between abdominal tumors, and particularly the nature of their attachments and the presence of adhesions, is obvious. Unfortunately, the dangers of the hyperdistention of the upper portion of the intestine to a great extent counterbalance its advantages. Several cases of rupture of the peritoneal covering of the sigmoid flexure, followed by peritonitis and death, have occurred in both sexes, and I believe the profession are now unanimous in relegating this original but heroic method to such instances in which the risk is justified by the exigencies of the case.

The *counter-indications* to the examination of the rectum by one or two fingers exist mainly in objections on the part of the patient, in the presence of fissures, ulcers, or hemorrhoids, rendering this maneuvre painful or difficult, and in strictures, rendering it impracticable. The presence of mucous patches or venereal warts at the anus may present obstacles in the interest of the physician, as also the distention of the rectum by feces. More serious and effectual objections are offered to the introduction of the *whole hand* by an unusually narrow sphincter or intestine, by more or less recent peritonitic adhesions, and by debility of the patient. All these objections may gradually be overcome by proper remedial means.

Recto-abdominal palpation will be discussed later on.

c. *Vesical Touch.*

The introduction of the finger into the bladder necessitates the previous dilatation of the urethra, and is therefore a method of examination not to be undertaken hastily or without due deliberation, and justifiable only when the ordinary means are insufficient for a diagnosis. The dilatation of the urethra should be looked upon as an operation, and should ordinarily be performed only under anesthesia, to be followed immediately by the introduction of the finger. The details of the operation will be described hereafter.

The vesical touch for the diagnosis of utero-pelvic disease has recently been elaborated and extensively practised by Dr. Emil Noeggerath of New York. It is chiefly useful in cases where it is desirable to feel the anterior surface of the uterus, and the broad ligaments, and the utero-vesical pouch of peritoneum, as in ante-uterine fibroids, small ovarian tumors, ovarian hernia. As in the rectal touch, the uterus, ovaries, and broad ligaments are rendered more accessible by drawing them down by a vulsella fastened into the cervix. The vesical touch may be required only to ascertain the condition of the mucous membrane of the bladder, and the presence of foreign bodies in that viscus.

If it is desired to touch the urethra only to, and through its entrance into the bladder, the little finger will suffice, and the urethra need be dilated only to that width; but if the interior of the bladder or the adjacent organs are to be touched, the index finger must be introduced up to its hilt. Whether index or little finger, the other fingers are best disposed of by being flexed in the palm, and pressed as far as possible into the vaginal cleft. The examining finger then has its palmar surface downward and is thus best able to feel the parts before it; of course it is rotated as occasion demands. Or the middle finger may be passed into the vagina. The patient occupies the dorsal or gluteo-dorsal position. If the instrumental dilatation has been thorough, the finger will readily slip into the bladder; but if it has been incomplete, the finger will gently accomplish the dilatation, and this is generally the way in which this examination is performed. The chief obstruction met with by the finger is at the ring of the meatus, and, this overcome, at the (so-called) sphincter of the bladder. Either hand may be used as most convenient. The lining membrane of the bladder, in the normal condition, has a soft, velvety feel. Simon has felt the mouths of the ureters and passed a sound into them; only the most practised touch will succeed in this maneuvre.

The *vesico-abdominal* examination will be described hereafter.

The counter-indications to the vesical touch are such as would render the preliminary dilatation of the urethra dangerous, or productive of lasting injury—such as recent para- or perimetric inflammation, or excessive fragility or rigidity of the urethràl tissues, whereby serious laceration or permanent incontinence might be induced. The urethra once dilated, there can be no objection to the gentle introduction of the finger.

The *vesico-rectal touch* consists in the simultaneous introduction of the index-finger of each hand into the bladder and rectum respectively. It is chiefly of use in diagnosing inversion of the uterus, in which condition the doubtful region of the cervix uteri can be thoroughly examined by the two fingers thus employed. This manipulation may also be of great utility in effecting reduction of the inversion, the two thumbs in the vagina pressing up the fundus, while the indices in bladder and rectum dilate the cervical ring.

E. *Bimanual Examination.*

By conjoined or bimanual examination or palpation is meant the simultaneous palpation of the abdomen with one hand, while the other is exploring one of the three female pelvic canals. We thus have vagino-abdominal, recto-abdominal, and vesico-abdominal bimanual examination, accordingly as the finger is introduced into one or the other of these cavities.

The simultaneous use of the external hand in depressing or steadying the movable abdomino-pelvic organs, or moving them about, or palpating their surfaces, or feeling any motion imparted to them by the internal examining finger, is of incalculable benefit in determining the shape and position of these organs, or of pathological formations in that locality. Without bimanual examination, but a very imperfect conception of the pelvic contents can be obtained, and the *indications* for its employment are therefore embodied in the brief and comprehensive sentence: *Wherever indagation is to be performed, there also is simultaneous abdominal palpation called for.* The physician should accustom himself never to introduce his finger into the vagina, rectum, or bladder without at the same moment placing the other hand on the abdomen of the patient, prepared to exercise whatever manipulation the case may demand. The patient should therefore always occupy, whenever practicable, a position favorable for the relaxation of the abdominal muscles and the diminution of intra-abdominal pressure, as well as convenient for palpation, *i.e.*, the dorsal position.

The *counter-indications* are the same—spasmodic contractions, inflammation, hyperesthesia, of the abdominal walls—as those interfering with simple palpation.

As the manipulation is essentially the same, whether the internal finger be in the vagina, the rectum, or the bladder, I shall group these three divisions under the same heading, and describe them together:

a. *Vagino-abdominal;* b. *recto-abdominal;* c. *vesico-abdominal—Examination.*

a. *Vagino-abdominal.*—As the finger passes up the vagina, the other hand is placed gently with extended fingers on the abdomen of the patient (the clothes having first been sufficiently loosened and lifted to give perfect freedom to the hand). As soon as the internal finger has completed its survey of the cervix, and the four quarters of the vaginal roof, the external hand gradually and gently increases its downward pressure, commencing first midway between umbilicus and symphysis over the usual site of the fundus uteri, and endeavoring either to press this body toward the internal finger, or to grasp it completely between thumb and fingers. In this manner, an existing ante- or retro-displacement is aggravated and rendered more clear to the internal finger; or the normal position of the fundus, previously suspected by the absence of a large body in either vaginal pouch, is assured. Besides the position, the size, shape, and contour of the fundus and body of the uterus may thus be accurately determined, the internal finger pushing the fundus up toward the outer hand, and placing it directly between the two hands. [In shape, the uterus is best likened to a pear compressed antero-posteriorly (the old comparison of the text-books cannot be improved upon); it is two and a half inches long, of which about one inch is intra-vaginal; about one inch thick, and nearly two inches wide at the fundus. An experienced touch can readily detect even a slight increase in these dimensions. But it should be remembered (and this is a rule which holds good in computing the size of all abdominal tumors) that one is very liable to overestimate the size of the uterus as felt through the vaginal and abdominal walls, probably because the thickness of its envelopes adds to its apparent size.] The size of the uterus can usually be ascertained only in this manner, and it is evident that this maneuvre is of the greatest importance in diagnosing moderate enlargement of the uterus, as it occurs during the first two or three months of pregnancy, during subinvolution or areolar hyperplasia, or in intra-uterine growths of moderate area. To detect a pregnancy of six weeks by this method (the only means by which it can be detected with any probable certainty, when aided by rational signs) requires unusual dexterity, and especially favorable physical circumstances; even at two and two and a half months the diagnosis is not always an easy one. The regular spherical outline of the uterine body, and the apparent equality of its antero-posterior and transverse diameters, may, aided by the soft, velvety cervix, assure the diagnosis. Besides, the soft, regular, obscurely elastic feel of the uterus gives an inkling of the presence of fluid. As already stated, to avoid voluntary or reflex contraction of the abdominal walls, the pressure should be gentle and gradual; the fingers should be but slightly curved and the parietes pressed inward until some firmer body is more or less obscurely felt; a pawing, or a rubbing motion of the tips of the fingers, whereby the abdominal wall is moved back and forth, or from side to side over the part under process of palpation, or that part is pressed against and again withdrawn from the internal finger, will generally serve

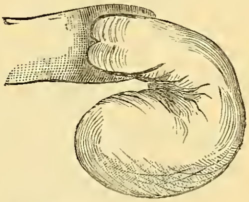


FIG. 23.—Retroflexion of uterus.

to give both hands a touch of all its surfaces. Frequently, in lax abdominal walls, the finger in the anterior or posterior cul-de-sac and the external fingers may be made to touch with only the intervening abdominal and vaginal walls between them, and in such cases the surfaces of the uterus, ovaries, and broad ligaments, are readily accessible. Laterally, the double folds of the broad ligaments generally prevent the fingers from meeting.

The beginner usually finds some difficulty in detecting the fundus uteri by bimanual examination; he either presses his fingers too close to the symphysis, or too high up toward the umbilicus. The normal position of the fundus uteri is about three inches above the upper border of the symphysis. By passing the internal finger into the anterior vaginal pouch, and pressing inward and downward toward the symphysis with the other hand, the fundus will usually be found between the two hands.

Besides size, consistence, and outline, the mobility of the uterine body, as influenced by motion of the cervix and the palpating hand, and its sensitiveness, are points worthy of notice. The normal uterus is exceedingly movable, especially in the antero-posterior diameter. Excessive mobility, so that the fundus may be pressed down under the symphysis or into the sacral excavation, or an anterior displacement may be changed to a retrodeviation or *vice versâ*, by a few simple manipulations, is indicative of relaxation of its supports; diminished mobility on the other hand, imparting to the finger the sensation of resistance, denotes previous inflammatory thickening or shortening of its supports.

Normally, the fundus uteri is not sensitive to moderate pressure; it has a dense, smooth feel. But, let it be enlarged and its surface irregular through areolar hyperplasia or subinvolution, and the patient will generally complain of more or less acute pain on compression; particularly if the abdominal wall is rubbed over the fundus.

When the position, size, and outline of the body and fundus of the uterus have been ascertained by palpation, the external hand is moved to one side and in the same manner presses the organs situated in the lateral portions of the pelvis toward the internal finger. By alternately pressing downward with the outer hand, and upward with the internal finger, and by rubbing the external fingers over the internal one, the region of the soft obscure broad ligaments is thoroughly searched, and the normal ovaries are in many instances recognized. When they are enlarged, or enclosed in a shell of plastic lymph, they are invariably detected with ease by this method. It should be noticed that the sensation imparted to the external fingers is generally more vague, like that of diffuse resistance; the internal finger, against which the organ is pushed, detects its outline, size, consistence, and mobility. In spare individuals the fallopian tubes, ovarian and round ligaments, can occasionally be touched in this manner.

A firm, immovable body in the broad ligament, like a cellulitic deposit of not very recent date, can usually be enclosed between the fingers of both hands, and its outline clearly mapped out; the same is the case with small ovarian tumors, cysts of the broad ligament and tube. In this way a unicornite or bicornite uterus may be detected, and the connection of tumors with the lateral uterine wall decided or denied. It is often extremely difficult to decide whether a tumor apparently attached to the side of the uterus by a flat, slender band, is a subperitoneal pediculated fibroid or a solid ovarian tumor with its pedicle of broad ligament.

In large abdominal tumors bimanual examination is useful in showing the connection of a growth felt by the internal finger with the bulk of the tumor; thus, if the external hand pushes the tumor downward, the impulse and descent is felt in the vagina, or if fluctuation is present the wave is detected by the internal finger, unless, indeed, the tumor be divided by septa. Further, a pelvic tumor may be raised by the internal finger, and its connection with the abdominal growth thus demonstrated.

The exercise of simple and conjoined palpation requires a vast degree of practice and a delicacy of touch greatly superior to that needed for mere indagation. The value of bimanual examination to the gynecologist and the results obtained are, therefore, proportionate to the skill of the individual examiner. To detect a pregnancy of six weeks solely by the slight increase in size of the uterine body; to discriminate between a pediculated subperitoneal fibroid of the uterus and a small multilocular ovarian tumor; to recognize obscure, deep-seated fluctuation in a cellulitic deposit between the layers of the broad ligaments by the doughy, boggy feel of the tumor; to map out the extent of an intraperitoneal exudation; all this requires years of experience and practice, easy though it may seem to the beginner.

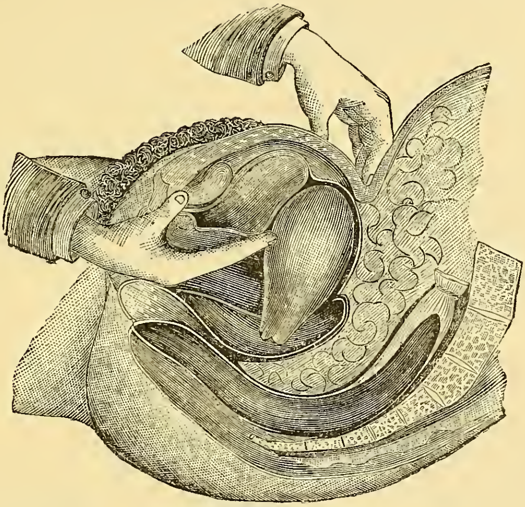


FIG. 24.—Bimanual examination.

b. *Recto-abdominal;* c. *Vesico-abdominal.*—The details of these methods are essentially the same as those of combined abdomino-vaginal examination. When the finger is in the rectum, the external hand is chiefly enabled to palpate the posterior surface of the uterus and broad ligaments, therefore the ovaries, and retro-uterine or (possibly) retro-rectal or retroperitoneal tumors. Retro-uterine tumors may often be more readily dislodged and grasped from above by this method. The distended sigmoid flexure, or a high rectal stricture can scarcely escape detection if this examination be made.

The external hand chiefly serves to press toward the finger in the bladder and steady the fundus and body of the uterus, the anterior face of the broad, round, and ovarian ligaments, and the fallopian tubes. The ovaries, naturally, although situated on the posterior surface of the broad ligaments, thus become accessible to the internal finger. The differential diagnosis between small ovarian cyst, cyst of the broad ligament, and hydro- or pyosalpinx, is often to be made only by this method, which enables the examiner to trace the outlines and attachments of the tumor with almost absolute accuracy. The diagnosis between cyst of the broad ligament and monocyst of the ovary is, indeed, possible usually only by the hypodermic needle and the microscope. The ovoid shape of fluid accumulations in the tube may prove an aid to diagnosis. The round ligaments are the seat, so far as I know, of only one variety of disease, a fibromyoma, which is of very rare occurrence. Intrapelvic exudations, extra- or intraperitoneal, may also be mapped out more clearly through the bladder; but it should be considered whether the advantage gained thereby compensates for the danger of urethral dilatation and vesical palpation.

Prof. B. S. Schultze, of Jena, has recently described a method of diagnosing the attachment and size of the pedicle of an ovarian tumor, by means of vaginal, rectal, and abdominal palpation. The patient being anesthetized in the gluteo-dorsal position, he introduces the index and middle fingers into the rectum along the posterior surface of the uterus, the thumb of the same hand into the vagina in the same direction; the other hand presses down the abdominal walls from the outside and seeks to grasp the pedicle of the tumor between it and the uterus. At the same time, an assistant, standing near the head of the patient, lays both hands on her abdomen, presses the abdominal walls downward as much as possible, and then alternately lifts the tumor up against the thorax and drops it, also drawing it to one side or the other. The fingers in the rectum, vagina, and on the abdominal walls feeling altogether cannot fail to recognize the size and attachments of the tumor to the uterus or its adnexa.

F. *Digital Eversion of the Rectum.*

When a patient complains of painful defecation, of bloody, mucous, or purulent discharge from the anus, or of hemorrhoids, it is advisable to inspect as much as can be readily exposed of the rectum. A simple, rapid, and comparatively painless method of exposing to view the lower two to three inches of the rectal mucous membrane is to introduce one or two fingers into the vagina when the patient is on her side, and attempt to press the tips of these fingers out of the anus. In this manner the mucous membrane of a portion of the anterior wall of the rectum and the edge of the sphincter become visible, and a fissure, ulcer, hemorrhoid, or a catarrhal hyperemia of the mucosa are readily detected. The posterior wall of the rectum cannot be seen by this plan, and but a very imperfect glimpse of it may be obtained by moderately dilating the anus with two fingers. For more complete inspection specula are required.

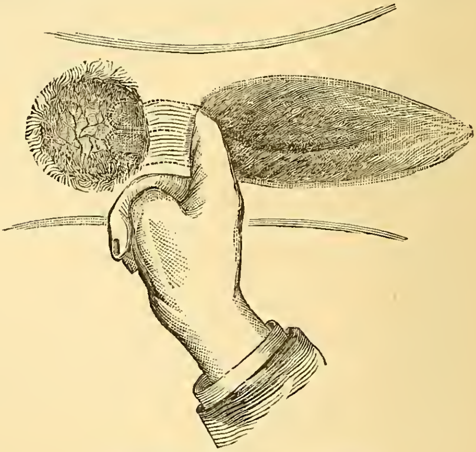


FIG. 25.—Digital eversion of rectum.

It may be appropriate here, at the close of the section on non-instrumental diagnosis, to say a few words regarding the normal position of the uterus. Strange as it seems, this question, apparently so easy of solution, still agitates the gynecological mind, and there are probably no two text-books or monographs on gynecology or anatomy in which the author has endeavored to advance his own original views on this subject, which give the same representation of the normal position of the uterus and its adnexa. Nearly all show it slightly anteverted, but some make it anteflexed, others antecurved, and others straight. And all call their diagrams "the *normal* position of the uterus." The best of these views are those of Kohlrauch, modified by Spiegelberg, Hodge, Sims, Thomas, etc. But none of these authors convey to the reader the impression that this position of the uterus is a variable one. Only recently have Schultze and Schroeder in Germany (whose opinions still differ), Hach in Russia, and Van de Warker in this country defined the subject more clearly and shown by experiments, that the *normal* position of the uterus is a *movable* one.

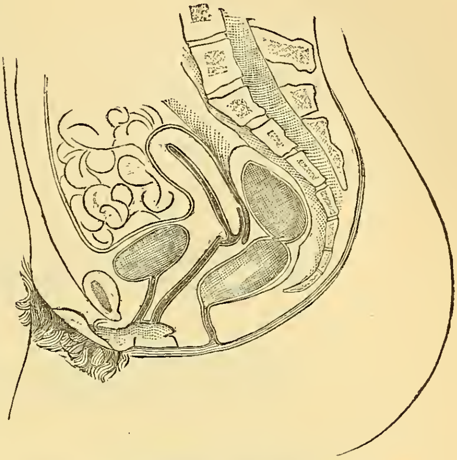


FIG. 26.—Normal relations of internal sexual organs.

The shape of the uterus is slightly ante-*curved* (not anteverted or anteflexed) its axis almost corresponding to that of the superior pelvic strait (I think the position given by Van de Warker in his article in the *Am. Jour. Obst.*, for July, 1878, decidedly too much anteverted, even with an empty bladder), its angle with the vagina measuring about 155°. *But*, this position of the uterus is subject to constant variations. In accordance with the degree of distention of the urinary bladder, the body and fundus of the uterus are moved backward, and this retrogression is increased if intra-abdominal pressure be diminished, as in the recumbent position. (Van de Warker says, l. c., "between the positions of the uterus in an empty and in a full state of the bladder there is a difference of 20° to 30°.") To a slighter degree an overdistended rectum will press the fundus forward. With

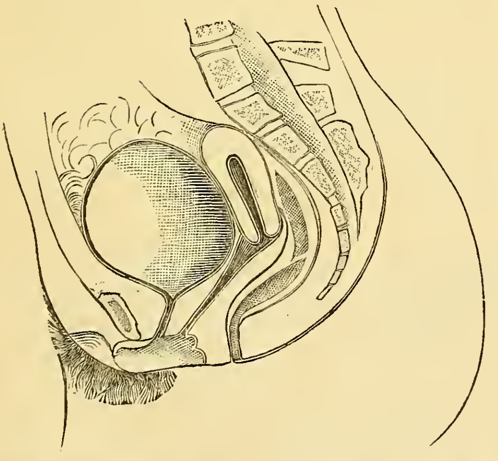


FIG. 27.—Backward displacement of uterus by distended bladder.

every variation in intra-abdominal pressure during inspiration and expiration and voluntary motions and positions of the body, the fundus and body of the uterus vibrate back and forth, like a pendulum, with its pivot at the reflection of the vagina on the cervix. It thus follows that we have several normal positions of the uterus, which I have been in the habit of considering as the first degree of normal ante-displacement, and first and second degrees of normal retro-displacement. Their extent is best described in the accompanying diagram.

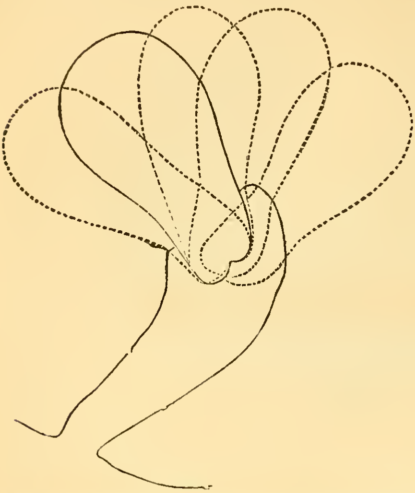


FIG. 28.—Degrees of normal mobility of the uterus.

II. Examination by Means of Instruments.

A. *Examination of the Urethra and Bladder by Sound, Catheter, or Speculum.*

Indications.—When a patient complains of painful, too frequent or too scanty micturition, or when the finger in the vagina detects an unusual sensitiveness of the urethral body or vesical base, it may be desirable to explore the urethra and bladder by means of instruments or the finger. Conditions of the *urethra* producing the above symptoms, are: caruncles, fissure, ulceration, simple spasmodic contraction of the circular fibres at the vesical neck; of the *bladder:* acute and chronic cystitis, stone, neoplasms (villous cancer).

Counter-indications.—To the gentle introduction of a sound or catheter into the urethro-vesical cavity there can scarcely be an objection; the use of a urethral speculum or endoscope necessitating previous dilatation of the urethra would be counter-indicated by the same conditions interfering with mere dilatation and given under Vesical Touch, viz., excessive fragility of the urethral wall and recent inflammation of the pelvic tissues.

Method.—A uterine sound, ordinary male or female metallic or elastic catheter, can be introduced into the normal urethra and thence into the bladder with no difficulty and very little pain. No obstruction is ordinarily met with at any point of the canal, and pain is experienced only at the junction of urethra and bladder, and when the instrument strikes against the opposite wall of the bladder. of the parts are inflamed, if urethritis and cystitis are present, the maneuvre will be painful, the more so the more acute the inflammation. If a tender point has been detected the exact spot may be more accurately examined by pressing the finger in the vagina against the intra-vesical instrument. Tenderness at the vesical neck may mean a fissure or ulceration of that spot. If bleeding follows the exploration, there may be intra-urethral vascular growths or caruncles, or fissures, or ulceration; or an abrasion of the vesical mucous membrane may be the seat of the hemorrhage.

Where absence of the uterus or ovaries is suspected, the tissues above the vaginal pouch may be searched with tolerable accuracy between the finger in the rectum and a catheter or sound in the bladder. This manipulation is particularly valuable in suspected congenital absence of the organs named, and in inversion of the uterus.

When it appears desirable to inspect the mucous surface of the urethra, the expansion of the canal by any dilating instrument, such as ordinary dressing-forceps or uterine dilator, will often suffice. Thus an ordinary hairpin, with its points fixed in a cork, may dilate the meatus sufficiently to give a view of the first half of the canal. Special instruments for the purpose have been devised by Barnes, Skene, and recently by Dr. Alex. W. Stein, of New York. Barnes's instrument acts on the principle of a tubular speculum, the slit being for the purpose of catching a caruncle, and presenting it ready for removal; Stein's speculum is a simple tubular dilator, which is to be gradually pressed inward until it passes the neck of the bladder, and then used as an endoscope for that organ, the different sections of the mucous membrane being one after the other brought into its focus. It is a very serviceable instrument, decidedly superior to that of Barnes, both for inspection and operation. A useful urethral dilator is the ordinary nasal speculum. Besides the speculum shown in the cut, Dr. Skene has devised an endoscope for the urethra and bladder, which consists of a glass tube, precisely like an ordinary test tube, varying in size according as it is to be used merely for urethral exploration, or is to be passed into the bladder, and of a section of a cylinder made black and having a mirror attached at rather an acute angle at its distal extremity. The glass tube is introduced first, into it the section with the mirror, and with an ordinary forehead-mirror light is thrown on the mirror in the tube; the shifting of the tube-mirror, forward and backward, or from side to side, exposes the various parts of the lining membrane of the bladder. The smaller size may possibly be used on the unprepared urethra, but, as a rule, to avoid breaking the glass tube, and indeed to gain a view which will be of any use at all, it is advisable to dilate the urethra, at least to the diameter of the little finger, before introducing the endoscope. Dr. Skene says that the pressure of the tube will give the mucous membrane a paler color than normal, but that this only serves to bring out more forcibly the inflamed portions. By pushing up the bladder walls from the vagina below and the abdom-

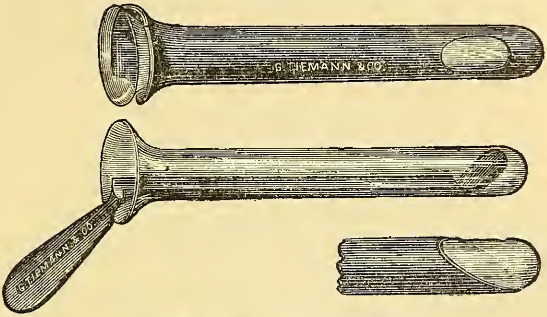


FIG. 29.—Skene's urethral endoscope.

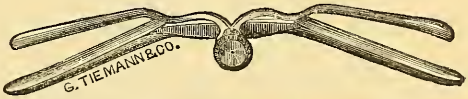


FIG. 30.—Skene's urethral speculum.

inal surface above, the whole interior of the organ can be brought successively within the focus of the endoscope.

An improvement on this endoscopic inspection of the collapsed bladder has been introduced by Rutenberg, who has made a very thorough study of this subject. He found that the walls of the collapsed bladder prolapsed against the lumen of the endoscope, and interfered with vision. He therefore distended the organ with water, which was too opaque and dimmed the mirror, and then with air, which is pumped into the bladder through the tube shown at *a* in the annexed cut. The speculum is made of German silver, of equal size at both ends, and of nineteen millimetres inside diameter; on this speculum (of which there are various sizes) is screwed the top with piston-rod for the mirror shown in the cut. At *b* is a glass window, and at *a* the tube to which the rubber tubing for the injection of air by a balloon is attached. The distention of the bladder is always painful; the examination, should, therefore, always be made under an anesthetic, even when the previous dilatation of the urethra is unnecessary. The bladder is first emptied of urine, and the speculum then introduced into the dilated urethra in the gluteo-dorsal position, the top is screwed on, and the bladder filled with air from the balloon by one assistant, while the other holds the lamp for reflection over the patient's pubis. The light is thrown into the bladder with an ordinary concave mirror. The endoscopic mirror is needed for the inspection of all parts of the bladder except the posterior and posterior inferior portion. The details as regards warming the mirror peculiar to a laryngoscopic examination also apply here. The distention of the bladder was found by Rutenberg to change the color of its mucous lining from dirty grayish red to light red, and to expose all the fine ramifications of vessels, and even fasciculi of muscles. The mouths of the ureters were never visible except after they were found with the urethral sound. Winckel, whose experience in this branch has been large, pronounces Rutenberg's method to be entirely devoid of danger as regards insufflation of air into the ureters, and in any other sense, and to be a very valuable contribution to the diagnosis of bladder affections. He found the light of an ordinary petroleum argand burner placed over the pubis quite sufficient for purposes of reflection.

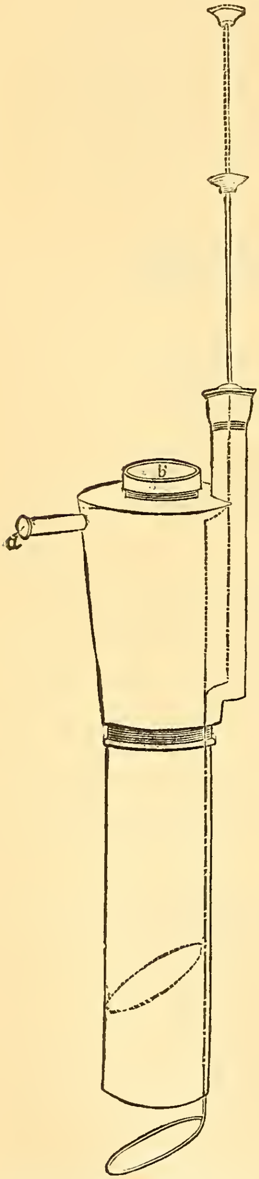


Fig. 31.—Rutenberg's endoscope.

The direct application of medicinal agents to diseased portions of the bladder mucosa is also rendered feasible through Rutenberg's endoscope.

The field of vision afforded by all these specula and endoscopes for the urethra and bladder naturally is but a small one, corresponding with the limited dilatability of the urethral canal, and their practical utility therefore in no way equals that of specula for other passages. Still, without them the diagnosis of urethral and vesical disease may often be entirely impossible.

The late Prof. Simon of Heidelberg practised and taught the introduction of sounds through the dilated urethra into the mouths of the ureters, for the purpose of detecting abnormal conditions of these ducts. What was undoubtedly possible to his acute touch, will scarcely be feasible for us without an amount of practice entirely out of proportion to the benefit to be derived from the operation. A practitioner so well versed in vesical disorders as Winckel, says that "notwithstanding great perseverance he never was so fortunate as to find the canal (of the ureter) with the sound."

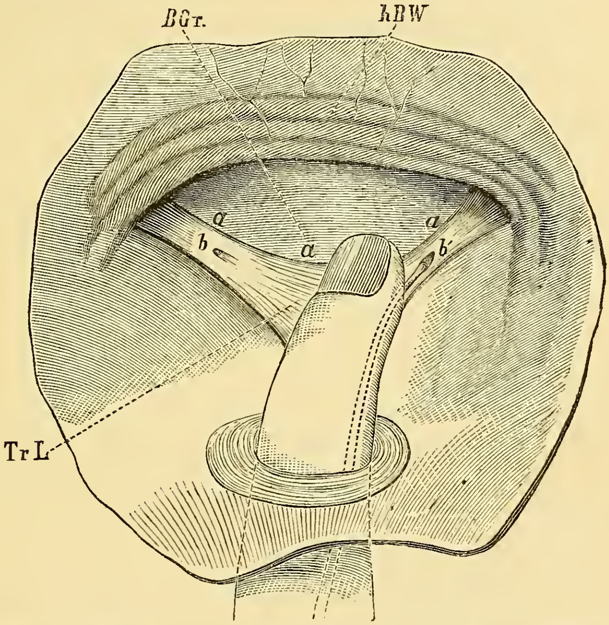


FIG. 32.—The finger in the bladder touching the mouths of the ureters. (Winckel.)

For completeness' sake I will merely say that the finger passed through the dilated urethra detects the nodule marking each ureteral mouth about one inch from the sharp vesical neck on the so-called inter-ureteric ligament about 1.25 to 1.60 ctm., each side of the median line. If the nodule is distinctly felt, Simon claims that a sound or catheter (long, blunt-pointed) can be passed along the finger into the slit, and by pressing the handle of the sound toward the opposite ramus of the pubic arch into the ureter, even up to the renal pelvis. Simon succeeded seventeen times in eleven women in this maneuvre, without injury to the patient. He advocated it for the diagnosis of ureteral and renal calculi, ureteral stricture, and the cure of hydronephrosis. The cases in which it will be indicated are obviously rare, and the evident danger of inflicting injury will suffice to prevent the too frequent employment of this exceedingly difficult maneuvre.

B. *Examination of the Vagina, Cervix, and External Os with the Speculum.*

Indications.—Not every patient who has been subjected to a digital examination of her genital organs need necessarily be examined with the speculum. The finger and the sound may have told us all we can expect to find in the case, and at all events they have shown us the absence of a necessity for further exploration. Besides, there are various conditions, hereafter to be enumerated, which counter-indicate a specular examination. But, I think myself justified in laying down the rule, that every patient who comes to a physician for a *first examination and a diagnosis*, deserves to have her case investigated by every proper means at our disposal, and that we should omit no measure which may give *us* the fullest possible insight into her case and *her*, therefore, the best chance for cure. I therefore make it a practice to examine every patient who comes to me for diagnosis and treatment *the first time*, not only with the finger and the sound, but also subsequently with the speculum, and have frequently had cause to commend, seldom to regret, this practice. Of course, the presence of a hymen, and other counter-indications will modify this rule to some extent, both as regards sound and speculum.

Special indications for a specular examination at any time are the detection by the finger of conditions of the vagina or cervix which require to be verified or corrected by the eye, such as granular vaginitis, laceration, ulceration, hyperplasia, carcinoma of the cervix, patulousness of and discharge from the cervix ; a leucorrheal or sanguineous discharge, the origin of which, from vagina, cervix, endometrium, or perhaps pelvic abscess opening into the vagina, only ocular inspection can decide.

Counter-indications.—The objections to a specular examination, are, 1. The needlessness of such an exploration, as evidenced by previous indagation. 2. The presence of a hymen or other obstacle to the introduction of the instrument (such as ulceration, acute inflammation, stricture or atresia of the vagina). 3. Excessive sensitiveness of the vulva (vaginismus) or vagina, or nervousness of the patient. 4. The probability of doing harm by the examination, as of exciting fresh hemorrhage or interfering with union after plastic operations.

That none of these objections, except absolute physical impossibility of introducing the speculum, are positive obstacles to such an examination is obvious, when the necessity therefor becomes imperative.

Varieties of specula, and methods of using them.—There are three chief varieties of vaginal specula : 1, cylindrical, or tubular ; 2, bi-, tri-, or quadri-valvular, or expanding specula ; and 3, duck-bill or Sims' speculum. Of all these varieties there exist numerous modifications and combinations, the number of which is legion, and the mechanism often so complicated, or differing so little from the conventional shape as to be either indescribable or unworthy of description. As every "rising" gynecologist seems to consider it a duty which he owes to the specialty to invent either a speculum or a pessary, I shall be compelled to confine myself to the description of such instruments as have been tested and found pre-eminently useful and practical over their competitors, and refer for a full list to the catalogues of the instrument-makers.

1. *The cylindrical speculum.*—The most popular, because the most convenient, are the cylindrical or tubular specula. They are manufactured of various substances—wood, metal, glass, gutta-percha, hard rub-

ber, horn. The materials most ordinarily used are glass, hard rubber, and metal. Those of glass and metal give the best light, but are relatively more expensive than the hard rubber tubes, the glass because they are so fragile, and the metal (brass or nickel-plate) because they soon tarnish and become dim and require repolishing or plating.

The specula of milk-glass devised by Mayer, of Berlin, are certainly more practical than those of Fergusson, which are composed of clear glass covered by tinfoil and a thick coating of polished rubber enamel. The milk-glass specula readily nick at the edge, it is true, and are then useless, but the enamel covering of the Fergusson chips off at the vaginal edge at the slightest violence and becomes brittle at a cold temperature. Besides, the excessive refraction of the Fergusson is unnecessary, and the light given by the milk-glass quite sufficient. While the glass specula are not affected by the contact of any medicinal agent, even the strongest acids, the metal instruments do not permit the use of any, even the mildest caustic, such as sol. nitrate of silver, or tincture of iodine. Neither of these materials, moreover, allow the contact of heat, as actual or thermo-cautery, for more than a few seconds, the glass being liable to crack, and the metal to become hot. The most practical tubular specula are undoubtedly those of hard rubber, which are light, durable, and relatively inexpensive. I have a sett which I bought at Leiter's, in Vienna, nine years ago, and have had in constant use since, wherever a tubular speculum was indicated, and they are still as good as new. This set consists of five specula, ranging in diameter from $\frac{3}{4}''$ to $1\frac{3}{4}''$, and in length, from $4\frac{3}{4}''$ (the smallest) to $5\frac{1}{2}''$; measuring from the expanded flange. They slide one into the other, being kept together by a cap, and are therefore exceedingly portable. They are not affected by any agent, or by heat, except, perhaps, a slight superficial discoloration; they are not fragile, and do not chip. The only objection to them is that their dark surface does not reflect the light as well as could be desired, particularly on a gloomy day, and when the smaller sizes are used. By means of a simple laryngoscopic head mirror or reflector (to be described hereafter) this objection may be overcome.

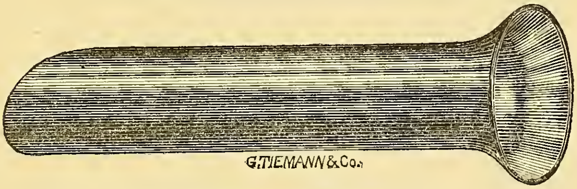


Fig. 33.—Fergusson's glass speculum.

I have recently been shown by Mr. Philipp H. Schmidt, instrument-maker of this city, a set of these hard-rubber specula, lined with nickel-plated brass and thus giving an excellent reflection. The objection to all metal specula, of tarnishing, applies to them, also, but the occasional cost of replating is but trifling.

Within a month I have been shown a set of three tubular specula made of celluloid. They are white in color, and therefore reflect exceedingly well. Besides, they are exceedingly light, durable—for they can be thrown on the floor without injuring them in the least—and are not affected by acids. Only absolute alcohol and camphor injure them. They are not expensive, costing about one dollar a speculum. In short, they are, in my opinion, the best cylindrical speculum in existence. They can be had of F. G. Otto & Sons, 64 Chatham Street, New York.

Tubular vaginal specula should vary in diameter from ½″ to 2″, and in length from 4″ to 6″, never longer than the latter. A short speculum will keep the cervix within easy reach, for touch and vision, while a long tube pushes it away and renders it less accessible. This is not, however, of importance for indagation, as some authors state; for what the touch can tell us about the cervix should have already been ascertained before the speculum is introduced; but, in order to enable us to see the cervix and reach it readily with forceps or other instruments. Thomas has devised what he calls a "telescopic" speculum, but I am not aware that it has ever become popular, probably because a long speculum can be shortened by not introducing it to its whole length, and specula are no longer made too long; and finally, because tubular specula are now rarely used for anything more than inspection, and the introduction of some medicinal agent into the vagina, but never for any greater operations on the cervix than the passage of the sound, or division of the external os, or scarification of the cervix.

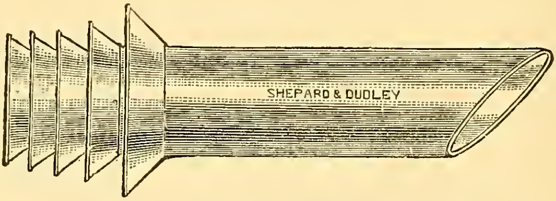


FIG. 34.—Set of metal cylindrical specula.

Cylindrical specula are now always made with a trumpet-shaped expansion at the outer end for the purpose of admitting more light, and are generally bevelled off at the inner extremity partly to facilitate introduction and partly on account of the greater depth of the posterior pouch of the vagina into which the bevelled point fits. Some specula are made square cut at the inner end, but the bevelled ones are preferable.

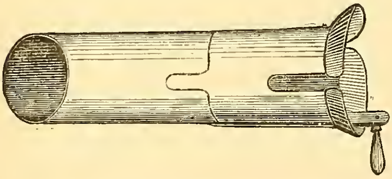


FIG. 35.—Thomas' telescopic speculum.

The tubular speculum will always retain its popularity with the general practitioner, who but rarely has to make a specular examination and merely desires to catch a glimpse of the cervix uteri, often with no particular object in view and hence with no result; besides not requiring assistance, and being simple in construction and cheap, it naturally answers several requirements. As already stated, for inspection of the vaginal walls and cervix, for application of fluid or pulverized medicinal substances to these parts, for the introduction of medicated tampons, for the application of leeches (where, indeed, it is almost indispensable) for scarification of the cervix, and even for division of the external os; for the introduction of the sound or probe, and frequently of cotton-wrapped and medicated applicators, the cylindrical speculum (especially the larger sizes) answers every purpose, and is thus by no means to be discarded, even by the specialist. But with these uses its field of utility ends. The operation for laceration of the cervix, or for vesico-vaginal fistula, or of division of the os internum, would be impossibilities, if we had to attempt them through a tubular speculum. Even the introduction of the sound or applicator may be difficult or impossible through the tube, if the uterine canal is tortuous, as in anteflexion, or narrow.

The size of speculum most commonly called for is that corresponding to No. 3 of my hard rubber set, one and a quarter inch outside diameter. The practitioner should, however, possess the set of these, or equivalent sizes of milk-glass specula, a few of which latter are always useful in dark weather or, in the smallest size, for unmarried women.

Introduction.—The ordinary position for introducing a cylindrical speculum is the dorsal, as already described. The patient is covered with a sheet, which is so wound about her legs as to hide them from view and expose only the vulva. The physician stands between the thighs of the patient slightly toward her right side, seizes the trumpet-shaped expansion of the otherwise well anointed speculum with the full right hand, and while the thumb and index finger of the left hand separate the labia and expose the vaginal orifice, passes the bevelled end with the point against the posterior commissure into the vaginal orifice. As soon as the bevelled point is fairly engaged under the pubic arch, steady backward pressure is made on the perineum with the speculum until the short portion of the bevelled extremity is below the bulb of the urethra and therefore below the pubic arch also, when the point is gently pushed inward and whatever resistance may have been experienced ceases. Either by gentle rotary movements or steady upward pressure (it is immaterial which), the speculum is passed inward, the physician taking note of the color and appearance of the mucous membrane of the vagina and the character of the secretion, if any exists, and the cervix sought for, the position of which organ, be it remembered, should always have been ascertained by previous indagation. If this precaution has been neglected the cervix may often elude the speculum for some time, especially if a displacement of the uterus is present. The cervix is recognized chiefly by its central opening, the os, but also by peculiarities of superficial appearance frequently met with in that part (erosion, enlarged follicles), and by its resistance to the further advance of the speculum. Some experience is required always to recognize the presence of the cervix, particularly in the nullipara whose cervix is unfissured and generally of exactly the same color as the vaginal mucosa; folds of vagina often interpose in the lumen of the tube and by their tranverse rugæ simulate the external os, but such folds can be pushed aside by sound or forceps and their true nature thus easily detected. Ordinarily the speculum pushed straight backward and upward in the axis of the vaginal canal will meet the cervix about three inches above the orifice; but if the uterus be displaced backward, forward, or laterally the point of the speculum must be directed in the opposite direction to find the cervix. Occasionally, I have found it so difficult to engage the cervix in the lumen of the tube, that I have introduced the sound into the uterus, and passed the speculum over the sound and frequently it is found necessary to draw the cervix into the speculum with the tenaculum.

Besides this difficulty of finding the cervix, I have noticed beginners to have trouble in inserting the point of the speculum well into the vaginal orifice, or rather, they would attempt to push the point beyond the line of the symphysis without first depressing the perineum, as above described. The result was the causation of great pain to the patient, whose urethral bulb was thus caught by the edge of the speculum and forcibly pushed inward, and the inability of completing the introduction. All this is avoided by carefully following out the rule above described, always to depress the perineum thoroughly with the speculum (this gives little or no pain) before attempting to pass it under the pubic arch. This obstacle overcome, the remainder of the manipulation is painless, unless the instrument be too large, the parts inflamed, or the point pushed too forcibly into the vaginal pouch. Occasionally, the perineum is so rigid and the contraction of the levator ani muscles so excessive, as to render the introduction of the speculum difficult or impossible; such rigidity or contraction may be normal to the patient, but it is generally due to reflex action produced by fear, and the first touch of the speculum.

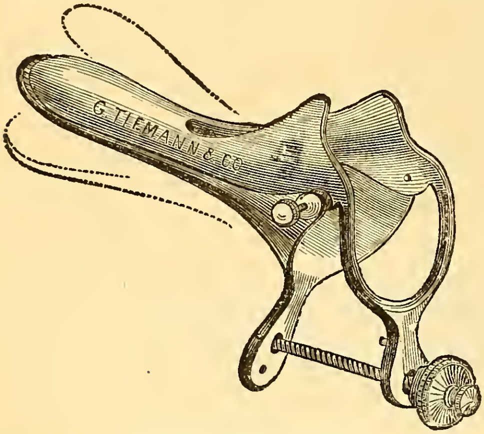


FIG. 36.—Brewer's speculum.

I have a patient, whose capacity readily admits the largest size (2 ″), but whose perineal and levator ani muscles contract so forcibly at every examination, that even the finger meets with opposition, and every specular examination (with whatever form of speculum it is made) causes decided expressions of pain on the part of the patient. The presence of a urethral caruncle, which has been inadvertently touched by the operator, may also give rise to the same reflex spasm. Pendulous nymphæ occasionally form a momentary obstacle to the insertion of the speculum.

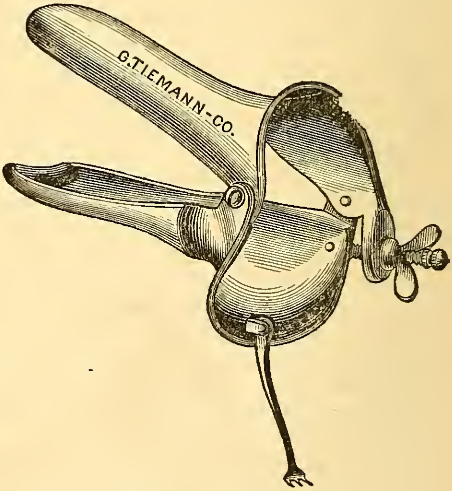


FIG. 37.—Hunter's speculum.

The cervix once engaged in the speculum, one of the first points to notice is the presence and character of discharge from the os, whether it is thin, glairy, purulent, discolored. Attention should then be paid to the size and color of the cervix (normal, pale pink, or purple or mottled), the size of the os (normal, round, transverse, or patulous), the nature of its edges (smooth or fissured). A purple color of the cervix may mean pregnancy, or may only indicate the venous hyperemia of subinvolution; or it may, indeed, be caused by the pressure of a too tight speculum. A mottled appearance, small, yellow, semi-opaque dots scattered over the pink surface, show occluded follicles, retention cysts, so-called ovula Nabothi. The eversion of the bright red and rugous cervical mucosa by the circular pressure of the speculum should not be mistaken for an erosion or "ulceration" of the cervix; the diagnosis is easily made by slightly withdrawing the speculum when the everted cervical mucosa will become reinverted, and the red surface disappear, while an erosion remains unchanged. It is not always easy, however, to differentiate between these two conditions, when there is a deep laceration of the cervix, the lips of which are so much everted and hyperplastic (like a split celery-top—Goodell), that they cannot be included in the speculum; all we see then, is a large, raw-looking surface entirely filling the opening of the speculum, and looking exactly like an indolent ulcer. This is the condition so long called and considered "ulceration of the womb," when the cylindrical speculum was

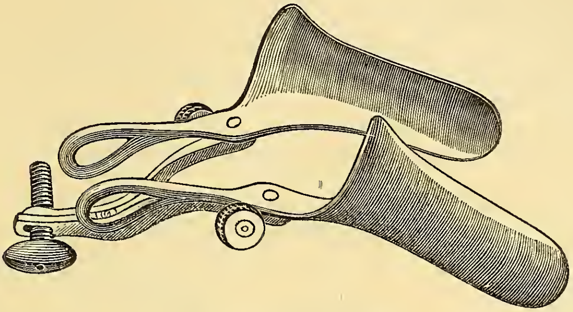


FIG. 38.—Goodell's speculum.

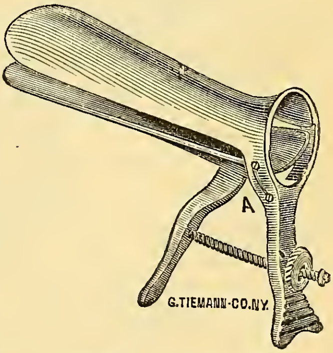


FIG. 39.—Cusco's speculum.

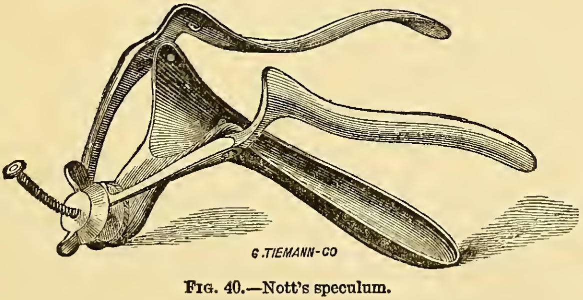


FIG. 40.—Nott's speculum.

the only one in use, and, for that matter, still so termed and treated accordingly by many practitioners of the present day, to whom the Sims speculum is an unknown quantity. The diagnosis in such cases should be made by the finger, and the appearance of the everted surface merely verified by the speculum.

In hyperplasia and epithelioma (cauliflower growth) of the cervix, the latter may also be so much enlarged as to exceed in diameter the lumen of even the largest speculum.

In cases where the cervix is very much displaced, especially if it or the fundus uteri is fixed by adhesions, it may be impossible to get it into the speculum.

I have described the dorsal position as the one in which a speculai examination should be made, and it is indeed that universally employed for the purpose. Only in some English text-books is the lateral position recommended. Since I have adopted the Sims speculum for every examination, I have also been in the habit of introducing the tubular and bivalve specula in the lateral position, and have found this practice in no wise inferior, and in some respects greatly superior, to the dorsal position. The chief advantage of the lateral position is that the patient is much less exposed, as the sheet can be so arranged as to cover her completely, leaving only the vulva in sight, without becoming disarranged and obstructing the view, as so often happens in the dorsal position when it is not retained by an assistant or nurse. At all events, the patient's face is so placed that she cannot see how much she is exposed, or what the physician is doing, and her position may thus be fitly compared to that of the ostrich with its head buried in the sand, which imagines the rest of its body to be equally hidden. The comfort of feeling that the patient is not watching one's every expression and movement has but to be experienced in order to be appreciated. Another advantage of putting the patient on the side for every specular examination, is that the position will not require to be altered again for the use of the Sims speculum, or the digital eversion or the examination of the rectum.

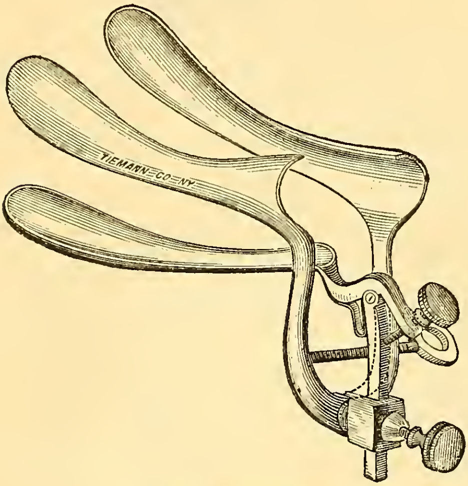


FIG. 41.—Ball's speculum.

The details of the introduction of the speculum are the same as those described; the left hand merely lifts the right labium majus, whereby the labia are separated and the vulvar cleft made to gap; the point of the speculum is inserted and the perineum depressed in precisely the same manner as in the dorsal position, the physician standing slightly behind the patient. The speculum should be passed rather more backward in this position, as the normal antecurvature of the uterus is slightly increased to anteversion, and the cervix, therefore, stands rather nearer the sacral excavation, than in the dorsal decubitus. It should be remembered that the longer end of the speculum is always to go behind the cervix, which can be regulated by introducing the speculum as above directed, and not rotating it.

2. *The bi- and tri-valve specula.*—As the chief desiderata of tubular specula are durability and reflection of light, so are those expanding specula the best, which are the least complicated and permit the widest separation at their vulvar end. All bi-, tri- and quadri-valve specula are so constructed as to have the fixed point of their branches at the vulvar portion of the instrument, where the screws or levers are situated which separate the blades. Thus the distal ends are more widely separated, while the vaginal orifice is comparatively but little distended.

These specula are made of metal, at the present time, all nickel-plated. While more expensive than the round specula, they are more durable and unlikely to get out of order, merely requiring occasional replating. Formerly, many plurivalvular specula were made with four, five, and even six blades, but at the present day it is conceded that two and, chiefly, three-bladed instruments answer every purpose attainable by a speculum of this construction. The blades are in the vast majority of instruments expanded in the antero-posterior direction, and many specula have a slit at the vulvar end of the upper blade to prevent pressure on the urethra. The inner ends are well levelled and rounded off, and the branches approximate so closely as to offer no obstacle to introduction. A few specula, bivalve and trivalve, are so constructed as to expand laterally. As a rule, the trivalve specula consist of one posterior concave blade, and two slightly curved anterior blades, which separate in the antero-posterior diameter, the anterior blades being so curved as also to distend the vaginal pouch laterally to a slight extent. The posterior blade is generally longer ($4\frac{1}{2}''$) than the anterior ($4''$) corresponding to the greater length of the posterior vaginal wall. For the same reason as mentioned in speaking of the cylindrical, the valve specula should not be too long, certainly not longer than $5''$. A long speculum pushes the cervix up, while one just long enough to reach behind the cervix, when expanded, naturally shortens the vaginal canal and brings the cervix down into its lumen.

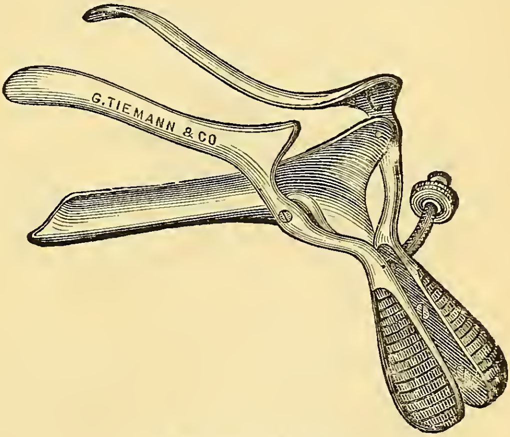


FIG. 42.—Nelson's speculum.

The advantage claimed for the plurivalve specula is the greater exposure of the vaginal walls; but this advantage is more or less counterbalanced by the diminished reflection of light, and by the tendency of the vaginal walls, when lax, to crowd between the blades of the speculum. Trivalve specula certainly possess greater degrees of expansion than bivalve, and are therefore usually more serviceable if any manipulation is intended on the cervix or endometrium ; and if it is advisable to inspect the posterior vaginal wall (say, for a recto-vaginal fistula) a quadrivalve may even be indispensable. For mere inspection of the vaginal pouch and cervix a bivalve with fairly large vulvar ring, will generally answer.

Of the older bivalve specula, the Cusco was the most popular, and is still mentioned in every text-book. In its original, unimproved form it no longer deserves approval, for its length is 5″ and while its internal expansion is sufficient (3″) its vulvar orifice is so small (1¼″) as to admit but little light and permit of scarcely any operative procedure on the cervix. In its modified form, it is shorter, has a wider vulvar expansion, and is a tolerably serviceable instrument. Of the valvular expanding specula now in use, I shall mention a number in their order of practical utility (so far as my experience goes), beginning with the best and referring for the description of the individual instruments to the annexed cuts, and the instrument makers. *Bivalve:* Brewer's, Hunter's, Goodell's (lateral expansion), Pallen's, Leonard's, Cusco's improved. *Trivalve:* Nott's, Ball's, Nelson's, Bozeman's (lateral expansion of the posterior blades), Meadow's. *Quadrivalve:* Meadow's. I presume my preference and discrimination in the order of these specula will not meet with universal approval; usually, every inventor considers the product of his brain the best. But, having put the beginner in search of a speculum on the track, I must leave him to create his own preference. Every one of the specula mentioned is a serviceable instrument, as doubtless are many others with which I have not become acquainted. I myself possess a Brewer (which, besides, has the occasionally useful quality of being transformable into a Sims by reversing the blades) and a modified Nott (in which the vulvar ring can be greatly enlarged by a sliding apparatus, to be described hereafter in connection with the combined specula), and cannot imagine the necessity for a greater variety. In case of need, the posterior vaginal wall can be exposed by simply turning the two anterior blades backward.

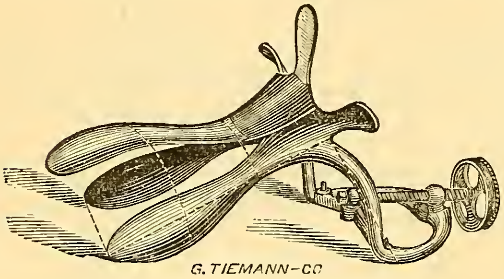


FIG. 43.—Bozeman's speculum.

Bi-, tri-, and quadri-valve specula are useful for exposing the cervix and vaginal vault (the latter according to the degree of their internal expansion), and certain parts of the vaginal walls. They permit the application of agents to the cervix, and the introduction of tampons into the vagina quite as well as the tubular specula, and for the introduction of substances (sound, applicator, bougies), into the cervical and uterine canal they are decidedly superior to the tubular, as they give more room and approximate the cervix to the vulva. But for the application of fluid or pulverized substances to the vaginal walls, and the leeching of the cervix, the valve instruments are inferior.

Introduction.—The valvular specula, like the tubular, may be introduced either in the dorsal or lateral position. The vulvar portion of the instrument is seized in the full right hand, and the rounded point of the closed blades pressed in their transverse diameter into the corresponding antero-posterior vulvar cleft and under the pubic arch in precisely the same manner as described under the cylindrical specula. As soon as the tip has passed into the vagina, the speculum is turned with the screw and handle downward (if the patient be in the dorsal position), or backward (if she be on the side), and the speculum is pushed gently into the vagina until its hilt almost presses against the perineum. The screw is then turned down until the cervix appears in the lumen of the speculum or the branches are opened to their utmost, or the handles may be rapidly approximated and the screw not turned down until the cervix is caught. If the cervix does not at once appear in the lumen, the speculum should be slightly withdrawn and reintroduced, or its point be directed in whatever direction previous indagation has shown the cervix to be situated, and the branches then again separated. When thoroughly expanded, particularly in rather tense, contractile vaginal walls, a plurivalvular speculum is retained in place without assistance of the hand, a manifest advantage when it becomes necessary to draw the cervix into its lumen or steady it with a tenaculum before obtaining a good view of it or succeeding in introducing a sound, etc., into the uterine cavity. This retention is aided by elevating the pelvis on a cushion. There is usually no particular difficulty in exposing the cervix in a valvular speculum, unless the vaginal walls are so flabby that they drop before the cervix and hide it from view. If the instrument is introduced too far before being expanded its point may go behind or before the cervix, and the latter be pushed forward or backward when the blades are expanded, of course entirely removing it from view.

The introduction and expansion of the speculum, and exposure of the cervix, are quite as easy in the lateral as in the dorsal position. The plain lateral is preferable to the latero-abdominal for this purpose, since the mouth of the speculum does not dip so much, and any fluid which may have been introduced into the vagina is less likely to flow out accidentally and burn the vulva and external genitals.

Neither the tubular nor valvular specula are properly self-retaining. If the patient remains perfectly quiet and does not bring her abdominal muscles and intra-abdominal pressure to bear on the intra-pelvic organs, the speculum may be retained without the guarding hand of the physician. As a rule it is safer, if the physician has other use for both his hands, to ask the patient to place her fingers on the upper margin of the speculum and keep it in place. It is very awkward to have a speculum forced out by the, perhaps involuntary, movement or straining of the patient, and her clothes soiled by the agent which had been introduced into the tube.

In withdrawing the speculum care should be taken to do so gently and not to clap the blades forcibly together, as folds of vaginal wall or vulvar tissue are readily caught between them and bruised.

With the bivalve speculum only the vault and lateral walls of the vagina are exposed; with the trivalve also the anterior wall; with the quadrivalve, a portion of the posterior wall also can be seen.

The univalve or duckbill speculum.—While the cylindrical and plurivalvular specula all act by separating the normally opposite walls of the vagina by mechanical force, the univalvular speculum attains the same object in an entirely different manner. It can attain this object only in a position of the patient in which intra-abdominal pressure is almost or entirely suspended; the function of the speculum is then, to a certain extent, merely to admit air into the vagina, when that canal becomes distended and its walls and the cervix would be distinctly visible, did not the collapse of the soft vulvar folds, although admitting the air by a cleft, in a great measure obstruct the view. If that were not the case, the mere introduction of the finger into the vagina would do quite as well as the duckbill; indeed, in some gaping vulvæ, as they are found in multiparæ, or women with lacerated perineum, the mere assumption of the semiprone or knee-chest position will expand the vagina and expose the cervix. Thus, in the absence of a speculum, the two fingers may be used in the semiprone position to retract the perineum and expand the vagina, often exposing the cervix, and proving useful for the introduction or removal of tampons.

The mere admittance of air, therefore, into the vagina does not suffice to give a clear view of its interior ; the firm retraction of the perineum by the speculum, and the separation of the labia are necessary to admit light into the vagina. This purpose was accomplished by Sims, when, twenty-five years ago, he accidentally discovered the principle and from it devised his famous speculum; this speculum which, in its elegance, simplicity, and efficiency, has in all these years been found incapable of improvement. It is not necessary for me here to enter upon the circumstances which led to this discovery—a discovery which has revolutionized the whole practice of gynecology, and has made a science of what formerly was merely a profession. In my opinion, the Sims speculum is the only absolutely perfect speculum, and it seems to me that it would be preferable to give up the specialty rather than practise without it. Even now, aided as the practitioner is by all the improved methods of examination and diagnosis described in the modern text-books, he who neglects to examine a patient suffering from uterine disease with the Sims speculum labors under a disadvantage, and deprives his patient of one of the greatest discoveries in modern medical science. Only through the Sims speculum is the cervix seen undisturbed and movable, with non-everted os and unimpeded circulation, and can the uterus be examined in its normal position unfettered by the enclosing and fixing branches of a speculum. The criticism which I have heard made on Sims' speculum by gynecologists of the old (very old !) school, that its backward traction displaces the uterus and everts the external os, and that the result of every such examination is an abnormal one, is simply absurd, and can be refuted at any examination.

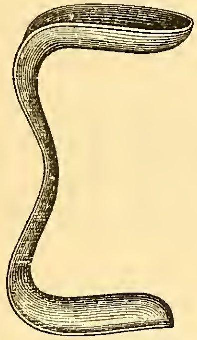


FIG. 44.—Sims' speculum.

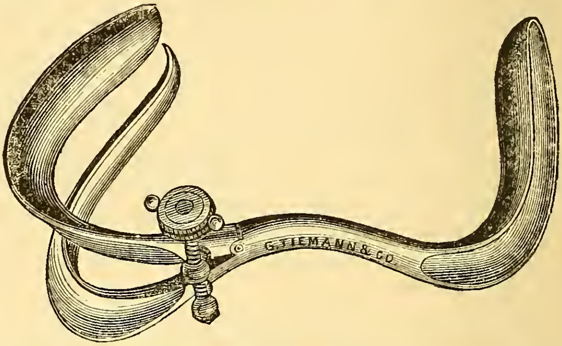


FIG. 45.—Dawson's modification of Sims' speculum (dilating blade).

It is unfortunate that the proper use of the Sims speculum absolutely requires the assistance of a nurse or assistant to hold the instrument and elevate the superior buttock, for the general practitioner and young specialist is thereby ordinarily prevented from using it habitually in private practice. But this objection, commonly advanced against it, is no argument whatever against the value of the instrument. I found it, in former years, quite possible to do without a nurse and still use my Sims efficiently in ordinary examinations and applications, by the aid of the lateral and longitudinal tip-table described on page 29. Whenever both hands were required, I of course employed a nurse, as I now always do, for such a person certainly is a great convenience; and, besides, her presence protects the physician against malicious accusations of attempted outrage, etc., which designing females occasionally make for purposes of blackmail.

As for operations on the cervix and vagina, suffice it to say that the duckbill of Sims has alone rendered them possible and successful. The similar instrument of Simon, it is true, affords easy view of access to the vagina and cervix, but it is used in the dorso-gluteal position, the anterior and lateral walls being separated by flat hooks held by assistants (three), and therefore acts merely on the principle of mechanical expansion.

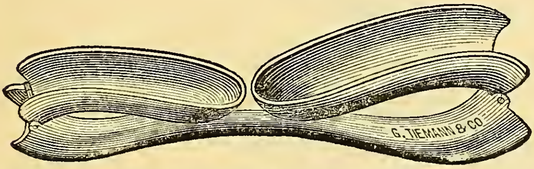


Fig. 46.—Dawson's modification of Sims' speculum (double-hinge).

Practically there is only one Sims speculum of various sizes; but several minor modifications have been given it, such as an increased curve of the handle, or diminished angle of blades, whereby traction is facilitated; or broader and shorter blades, so as to distend the posterior wall more and bring the cervix closer to the vulva for operations; or the addition of a hinge at the angle of each blade and the handle, to facilitate the carrying of the instrument; or the separation of the blade into two equal halves by means of a screw and bar, so as to expose the posterior wall of the vagina; or the expansion of the upper edge of the blade into a flange, so as to support the upper buttock and prevent it from obstructing the view.

These minor modifications all have their utility in appropriate cases. The speculum shown in Fig. 47 would seem to me very practical as a substitute for the left hand of a nurse.

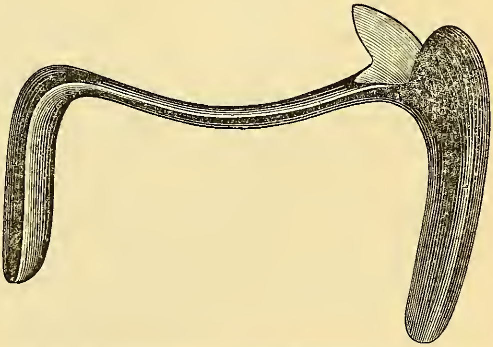


Fig. 47.—Modified Sims to support the buttocks. (Heburn, St. Louis.)

Of the ordinary shaped Sims (see Fig. 44), there are generally four sizes, two on each handle; besides an entirely smaller speculum, also two sizes, for a virgin or very narrow vagina. The instruments are silver- or nickel-plated, and very durable, but require frequent replating.

Indispensable adjuvants to the Sims speculum are the depressor and tenaculum; the former to press forward the anterior vaginal wall and bring the cervix into the axis of the canal, and the latter also to bring forward and steady the cervix. The depressors, of which cuts are here given, are the best. The tenacula represented in Figs. 49, and 50 have a somewhat curved hook, and are less liable to slip or tear out than that seen in Fig. 48, the hook of which is at right angles. The latter is useful in operations in catching up sutures; but both varieties are frequently sold indiscriminately, to the subsequent great annoyance of the operator. Where traction is desired, the curved tenaculum is the best; where the object is to approximate two surfaces, as the lips of a torn cervix, or the edges of any wound, the rectangular hooks are preferable.

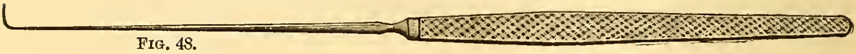


Fig. 48.

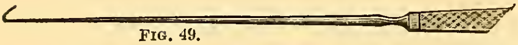


Fig. 49.

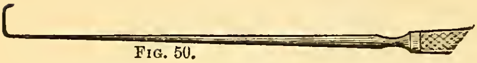


Fig. 50.

Figs. 48, 49, 50.—Different shapes for tenacula.

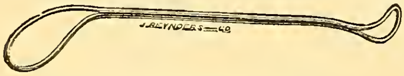


Fig. 51.—Sims' double-end depressor.

Mode of using the duckbill speculum.—The patient occupies the latero-abdominal or semiprone position, usually the left (already described), on a flat table or couch, with her hips close to the left edge, and her head near the right upper corner of the table. She is covered with a sheet, only her vulva being exposed, and her clothes are well drawn back away from the sacrum in order not to interfere with the handle of the speculum; a tightly laced corset or dress should be loosened. The lower buttock is covered by a napkin tucked in between the thighs and under the buttock, in order to prevent soiling the clothes. The physician sits behind the patient on a chair of convenient height, with the instruments to be used (speculum, depressor, tenaculum, sound, probe and dressing-forceps in a basin of warm water on a chair or table at his right hand. The examining table should be so placed and the physician so sit as to permit the best light to fall on the vulva. He takes the speculum from the basin, covers the outside of the blade to be used with an emollient (soapsuds, vaseline, or the simple water will do), places the index finger of his right hand flat into the concavity of the blade to be introduced; seizing the shank with the other fingers and thumb, and gently lifting the superior or right labium with the other hand (or the nurse may do this), introduces the point of the blade and finger with the concavity downward into the vaginal orifice. As soon as the finger and speculum are fairly in the vagina, the concavity of the instrument is turned forward, and the point backward toward the coccyx, and the blade, guided by the finger, along the posterior wall of the va-

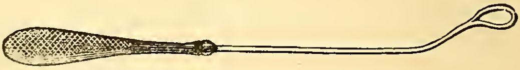


Fig. 52.—Sims' depressor, with handle.

gina until its progress is stopped by the junction of blade and handle touching the perineum, that is, when the blade is completely within the vagina. The left hand of the operator then seizes the external blade firmly and makes steady traction, the line of traction not being directly backward, but slightly upward, so as to raise the upper buttock and admit more light. Having thus thoroughly retracted the perineum and admitted air and light into the vagina, perhaps even already exposed the cervix, the speculum is handed to the nurse, who, standing at the patient's sacrum, seizes the speculum in her right hand with the thumb in the concavity and the four fingers grasping the blade, and makes steady traction backward and upward, while the four fingers of her left hand

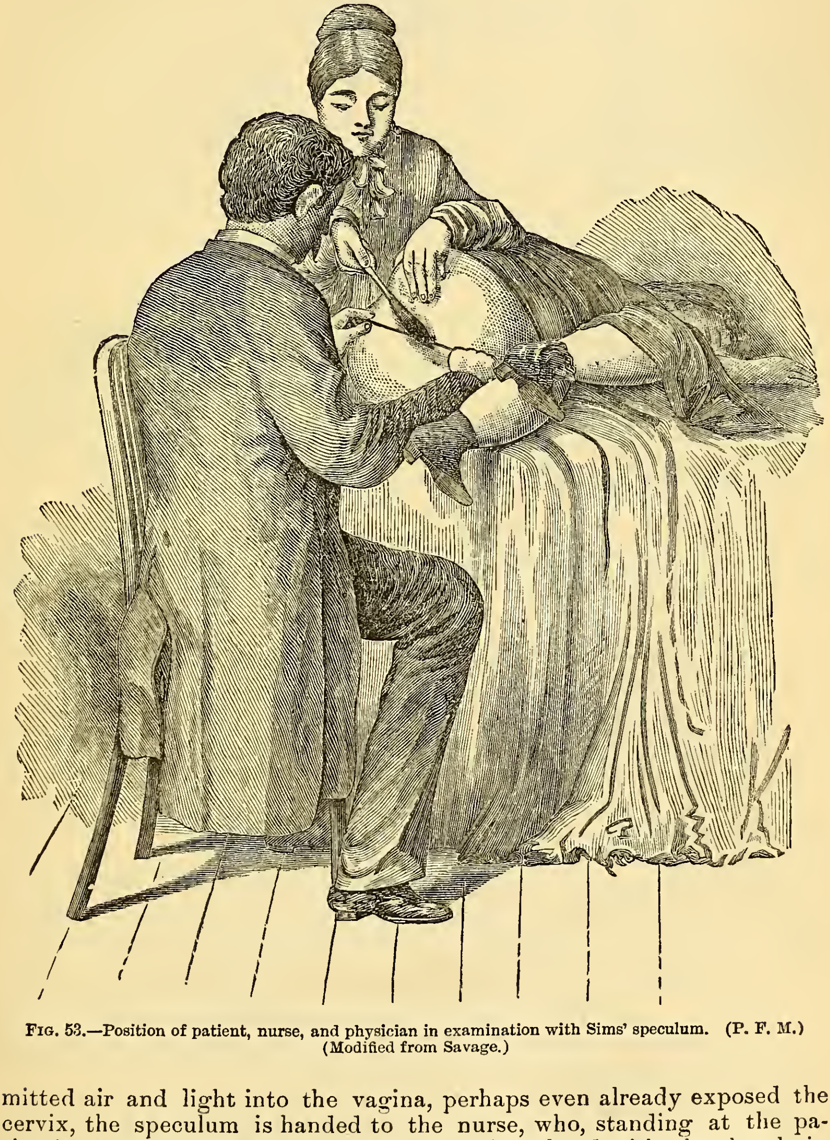


Fig. 53.—Position of patient, nurse, and physician in examination with Sims' speculum. (P. F. M.) (Modified from Savage.)

draw the right buttock and labium gently upward. The direction of traction is a matter of great importance; if the traction is made straight backward the light will not enter the vagina freely, even though the superior buttock is raised by the nurse, since the axis of the vagina will be downward; as soon as the slight upward twist is given to the speculum the vaginal orifice points upward, and the depth of the vagina is at once illuminated. Further, it is important that traction should be so exercised that the point of the inner blade is neither directed too far back nor again drawn away from the posterior vaginal wall; if too far backward, the cervix is drawn out of sight, and if too far forward, that is, if the nurse draws too much toward the head of the patient, the speculum may be entirely pulled out of the vagina.

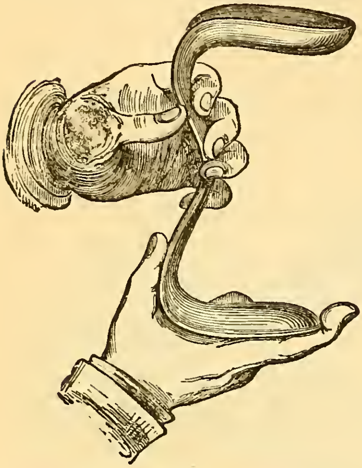


Fig. 54.—Manner of holding and introducing Sims' speculum according to Sims.

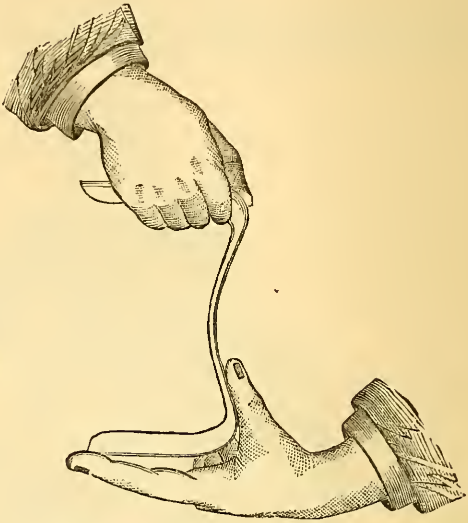


Fig. 55.—Manner of holding and introducing Sims' speculum, modified. (P. F. M.)

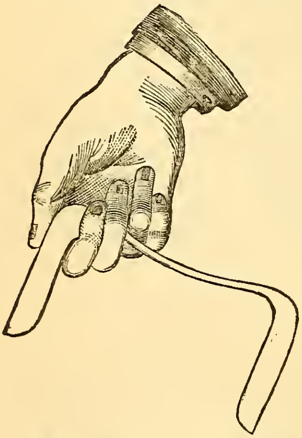


Fig. 56.—Manner of holding Sims' speculum for introduction without guidance of finger of right hand. (P. F. M.)

I have found it useful in rapidly exposing the cervix, particularly if it is situated far back in the sacral excavation, first to employ the straight backward traction, as described, until the vagina expands, and then tilt the inner point of the speculum slightly forward; by this maneuvre the cervix is, as it were, lifted out of the hollow of the sacrum and fully exposed.

The expert can dispense with the guiding finger in introducing the speculum, and seizing the external blade in his right hand, and lifting the right labium with his left, may gently slip the blade into the vagina and behind the cervix, closely hugging the posterior wall. The beginner is liable to pass the blade too far forward in front of the cervix, which then, of course, when traction is made, is drawn backward out of sight greatly to the astonishment of the examiner, who cannot imagine why he cannot find the cervix.

By grasping the speculum as above directed, resting the right forearm on her right hip, and drawing steadily backward in a direction corresponding to a line running from the patient's left pubic bone to her right tuber ischii, the trained nurse can stand erect and bear this position for a length of time entirely impossible for an inexperienced person. It is important both for the convenience of the operator and the comfort of the patient that traction be steady and the speculum be shifted by the cramped or tired fingers of the nurse as little as possible. Steady traction, while at first somewhat painful (and it is this traction on the perineum which causes the real and only pain complained of during an examination with Sims' speculum), is soon borne without a murmur, while frequent shifting of the instrument always causes fresh pain. Pain may also be caused by allowing the lower, rather sharp, edge of the blade to rest heavily against the lower labium, as is the case when traction is not made in the prescribed direction.

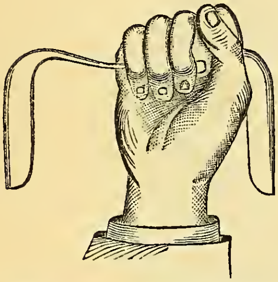


FIG. 57.—Manner of holding Sims' speculum according to Sims and Emmet.

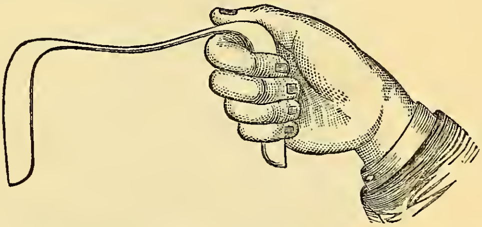


FIG. 58.—Manner of holding Sims' speculum, modified. (P. F. M.)

This question of traction and holding the speculum is exceedingly simple to the expert, but full of difficulty to the beginner. A nurse untrained in this particular is a source of annoyance and positive disturbance to the operator. It is obvious that, in order to give the nurse the proper directions, the physician should himself know how to use the speculum. For this reason I have been rather prolix, perhaps, in the above description. The necessity for such minute detail has frequently been illustrated to me in my private classes, when gentlemen (often older practitioners) could not succeed in exposing the cervix, simply because they made straight backward traction, and drew too much on the point of the inner blade. A mere upward twist of the blade and forward tilting of its point would at once bring the cervix forward and in full view.

As a rule, I follow the plan of first thoroughly exposing the cervix and vagina myself by the speculum in the left and the depressor in the right hand, the nurse merely drawing up the right labium, and do not hand the speculum to the nurse until I have it exactly where I want her to keep it; any subsequent shifting is to be done by myself.

The above method of holding the speculum is the one I have always practised and taught, and in my experience it has proved perfectly satisfactory; indeed, I myself have repeatedly, in assisting friends at operations for laceration of the cervix, held the speculum in this way for nearly an hour without becoming tired. But Dr. Emmet in his recent work describes a somewhat different method, which to me certainly does not appear as comfortable as the one I employ. After speaking of "traction on the perineum" with the speculum, he says: "By placing the buttocks close to the angle of the table, the assistant is enabled to stand sufficiently behind the patient to steady the instrument. This is not done by traction, but by using the width of the hand like a wedge between the buttock and upper edge of the speculum. The central portion or isthmus of the instrument lies against the flat of the hand, and the upper part between the thumb and index finger, so that the fingers are free, and can be moved without disturbing the position of the speculum. By thus using the hand as a wedge, the instrument can be steadily held in place for hours, during a long operation, without cramping the fingers. It promotes greatly the comfort of the patient to have the instrument held in this manner, and enables her to relax her muscles, which she cannot do if the perineum and rectum are irritated by the frequent jerking which occurs when traction is made by the fingers alone, without a resting-place for the hand, as I have described."

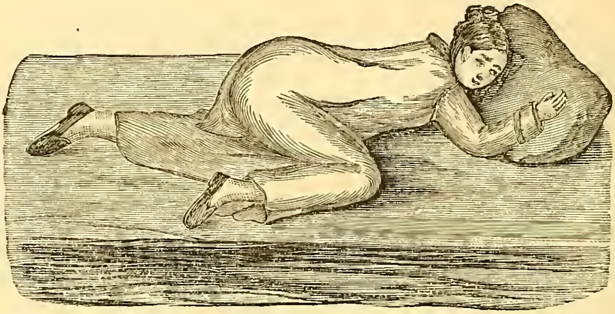


Fig. 59.—Incorrect position of patient for examination with Sims' speculum. (Halliday Croom, Leblond.) Illustrating necessity for detailed description of the position.

When I speak of traction, I mean, of course, a *steady* uninterrupted retention of the speculum in the position in which it was handed to the nurse after the cervix was exposed, not a forcible, spasmodic pulling at the speculum. It is true, the operator exerts the traction on the perineum before he hands the instrument to the nurse, who keeps the perineum in that condition of retraction, but, after all, what is it but "traction" which keeps the perineum back?

Emmet follows Sims in this method of holding the speculum, and, therefore, it may appear presumptuous to modify the inventor's own directions. But I have found my plan serve me admirably, and if the arm is rested against the side and hip, much less fatiguing than the full grasp recommended by Sims and Emmet.

This matter must naturally be a question of habit and practice, and, doubtless, both plans answer equally well in the hands of the expert.

The nurse having taken charge of the speculum, the operator takes the depressor in his right hand, and with it presses the anterior wall of the vagina forward, thereby drawing the cervix still farther into the vaginal axis. If necessary, even then, to attract or fix the cervix, its anterior lip is seized by a tenaculum, which is hooked into the endocervical mucous membrane from within outward, and by which the os may be opened, and the whole uterus drawn down.

If the physician is obliged to examine his patient without the assistance of a nurse, his left hand is used to separate the labia, and then seizes the speculum, and gives it the utmost upward twist possible, while the right hand sharply separates the anterior vaginal wall with the depressor. By bowing the head, the eye may generally succeed in reaching the cervix, and getting a fair glimpse of it. The overhanging of the superior buttock, however, usually interferes with vision; and to obviate this, the flanged speculum shown in Fig. 47, should prove useful. If the patient lies very thoroughly on her side and, particularly, if the table has the longitudinal and lateral tip described on page 29, the expansion of the vagina will often be sufficient to enable the physician unaided to obtain a good view of the parts, and, dispensing with depressor or tenaculum, introduce the probe, or sound, or applicator. The introduction of vaginal tampons, and the application of tincture of iodine, or other agents to the vagina and cervix, is thus perfectly feasible.

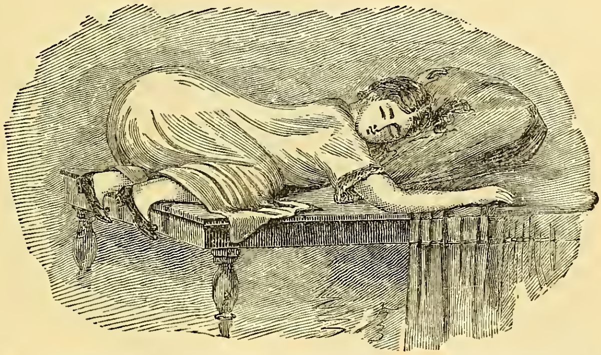


FIG. 60.—Correct position of patient for examination with Sims' speculum. (P. F. M.)

The whole vagina, except the posterior wall, and the cervix in its totality are exposed freely to view through Sims' speculum, an advantage offered by no other form of speculum, and not to be undervalued. The cervix, being visible in its whole periphery, it is much easier, perhaps possible only, to recognize deformities and injuries of that organ through this speculum. Thus, for instance, laceration of the cervix is easily recognized, and its extent and curability determined only through this instrument. This is done by seizing each lip with a tenaculum from its vaginal surface and approximating the lips when the everted cervical mucosa will be rolled in, and the normal shape of the cervix be restored; if the lips cannot be approximated, either lateral adhesions or, what is more common, cystic and areolar hyperplasia of the cervix are present. Thus, a laceration can readily be distinguished from an erosion of the cervix, in which latter there are obviously no torn lips to approximate. It is often possible by thoroughly separating the vaginal walls with speculum and tenaculum to obtain a view of a good portion of the cervical canal, especially if the cervix be lacerated.

The duckbill speculum may be used with equal facility in the right semiprone position, the directions for its employment, so far as the hands are concerned, merely being changed from left to right, or the reverse. In cases where it is desirable to see or reach the right upper portion of the vagina, as in fistulæ in that region, or the aspiration of cellulitic abscesses in the right broad ligament, this position is preferable to the left.

In the knee-chest position, the Sims speculum is also a very useful instrument. By lifting the perineum with it, air and light are admitted into the vagina, which is distended balloon-like, every fold and crevice becoming effaced. A better view of vagina and cervix are obtained in this manner than even in the semiprone position; the objection to the knee-chest position is its inconvenience to the patient, and consequent unsuitableness for long examinations. The speculum is simply slipped into the vagina sideways, turned, and its shank grasped by one full hand, which makes strong upward traction, while the forearm rests on the sacrum as a fulcrum. Depressor and tenaculum are generally not needed to expose the cervix. In stout women, it is usually necessary to separate the nates before obtaining a full view. An examination in this position may be advisable when it is desired to obtain a view of the distended vagina (fistula, vaginitis); it is chiefly employed as a preparatory step to replacing a retro-displaced uterus (see Figs. 214 and 215), or introducing a pessary, or operating on a vesico-vaginal fistula.

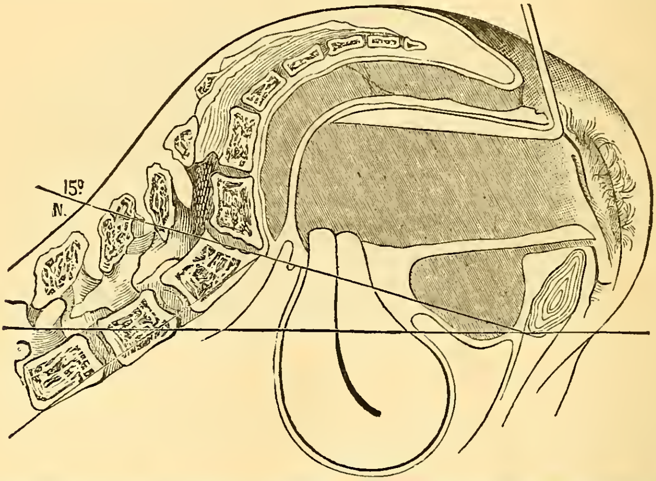


Fig. 61.—Expansion of vagina. Position of uterus and speculum in the knee-chest position. (Hegar and Kaltenbach.)

In case of emergency, the two first fingers of the right hand may be used as a substitute for the duckbill speculum, and a view of vagina and cervix be obtained, or tampons introduced or removed by their aid in semiprone and knee-chest positions.

The difficulties encountered in making a specular examination are chiefly such as are due to the presence of the hymen, or constriction, or rigidity of the vaginal orifice and perineum, or sensitiveness and soreness of the parts. The obstacle caused by these conditions may be overcome by great gentleness and persuasion, the use of a very small speculum, and previous careful anointing of the vaginal orifice; in aggravated cases, anesthesia may be required. When the resistance is due to vaginismus, or erosion of the vulvo-vaginal orifice, the repeated application of a solution of nitrate of silver (grs. xv. to xxx. to the ounce), or of iodoform or belladonna ointment or suppositories, will generally toughen the parts so as to permit the examination. A very common obstacle to a clear view of the interior of the vagina, is the forcible contraction by the patient of the perineo-vaginal muscles, and the pressing down of the anterior vaginal wall. Gentleness and persuasion will soon overcome this. In stout women, a broader and shorter speculum is required to expand the vagina thoroughly, and bring the cervix nearer the orifice. If the vaginal walls are very flabby and foldy, some difficulty may be experienced in preventing them from obstructing the view of the cervix; a short, broad speculum, a large depressor, and downward traction with the tenaculum will generally overcome this. If necessary, the examination may be made in the knee-chest position, and will then always be successful.

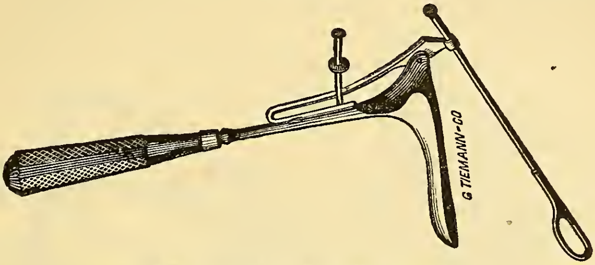


FIG. 62.—Thomas' modified Sims' speculum.

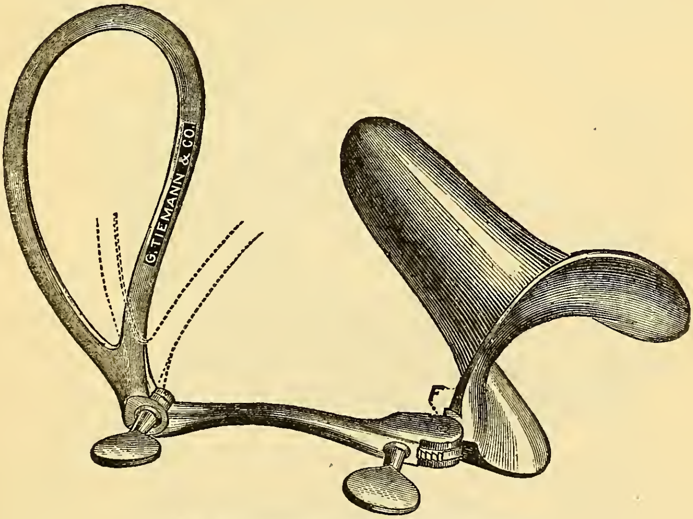
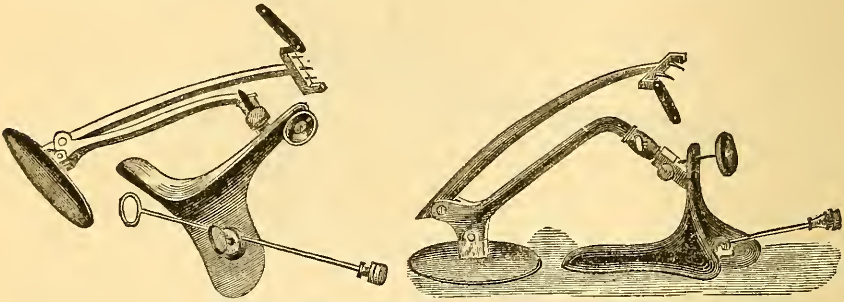


FIG. 63.—Emmet's modified Sims' speculum.

Modifications and combinations of the Sims speculum.—Besides the minor modifications represented in Figs. 45 to 47, numerous other contrivances have been adapted to Sims' speculum, all with the view of supplying the place of an assistant. Of these the most simple is that of Thomas, the attached sliding depressor of which is intended to free the right hand; but I have found the breadth of the blade at the angle, and the shank holding the depressor, entirely insufficient to prevent the overlapping of the superior natis, and the view therefore quite as much obstructed as with the plain Sims and no assistant. The only advantage of this instrument is the attached depressor. In spare women, with tense vulva and vagina, it will often be found serviceable.



FIGS. 64 and 65.—Erich's modified Sims' speculum.

Greatly more pretentious are those modifications which seek to do away entirely with an assistant and also give the physician the use of both hands. Numerous devices of this nature have been published, and others, to my knowledge, have not as yet been laid before the profession. Perhaps the most serviceable self-retaining specula are those of Emmet, Hunter, Erich, and Studley, the nature and application of which is sufficiently illustrated by the cuts. Emmet's, Erich's, and Studley's specula I have tried and found decidedly useful. The objection to all these contrivances, however, it seemed to me, was the impossibility of securing the upward twist of the blade so strongly insisted upon in my description of the ex-

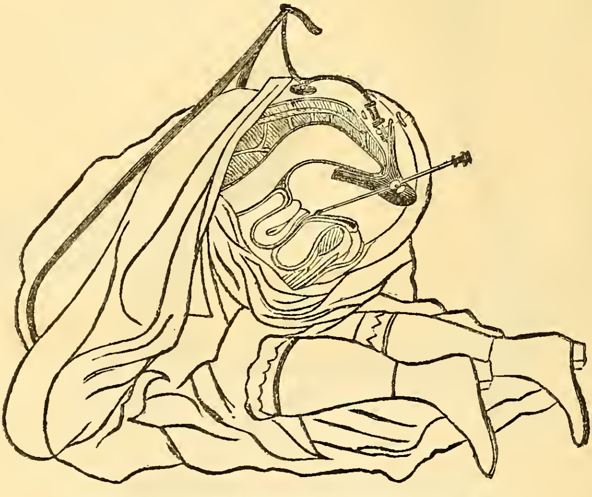


FIG. 66.—Erich's modified Sims' speculum—in position.

amination with the Sims, which twist is so essential to the proper illumination of the vagina. The point is, that the hand which lifts the superior natis and labium cannot be dispensed with. Another objection is the preparation required to adjust these instruments, which may alarm the patient.

There are but two combinations of Sims and another speculum, so far as I know, and they are by Dr. Gillette, of New York, and myself. In both of these instruments a Sims is combined with a Nott speculum, and both are designed to be used in the semiprone position only when combined, and in the dorsal or lateral when the detached Nott is employed. The advantages of Dr. Gillette's instrument are the shortness of the shank of the Nott, when detached, and the curve (Van Buren's) of the other blade, which renders it serviceable for rectal examination. The advantage of my instrument, on the other hand, is the ability to enlarge the antero-posterior expansion of its vulvar orifice by sliding forward the anterior branches (the ant. post. diameter of the orifice then measures three, to two inches unenlarged, the transverse diameter two inches), an advantage not to be undervalued, as it not only gives more room but fixes the whole instrument more firmly in the vagina. In both instruments the Nott is detach-

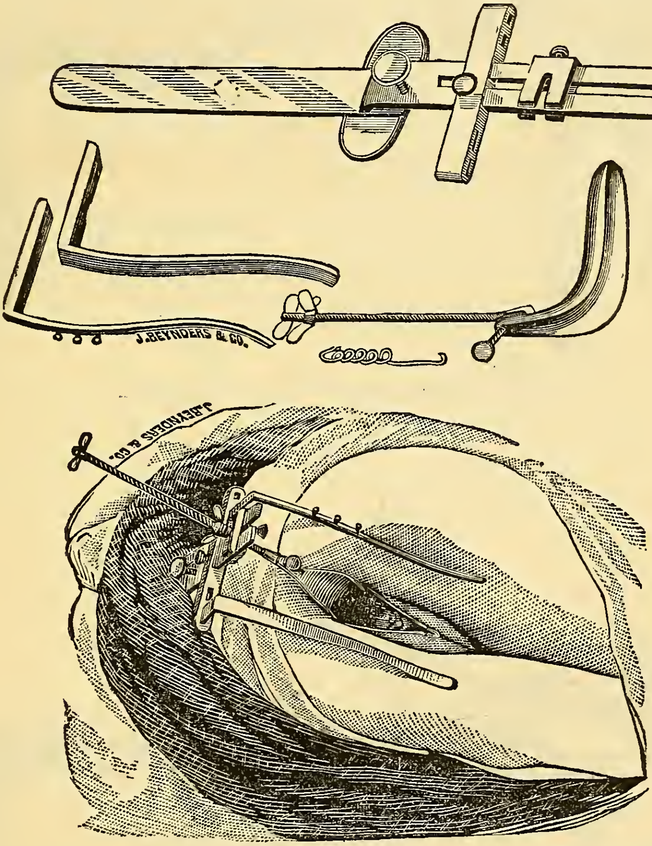


FIG. 67.—Studley's modified Sims' speculum.

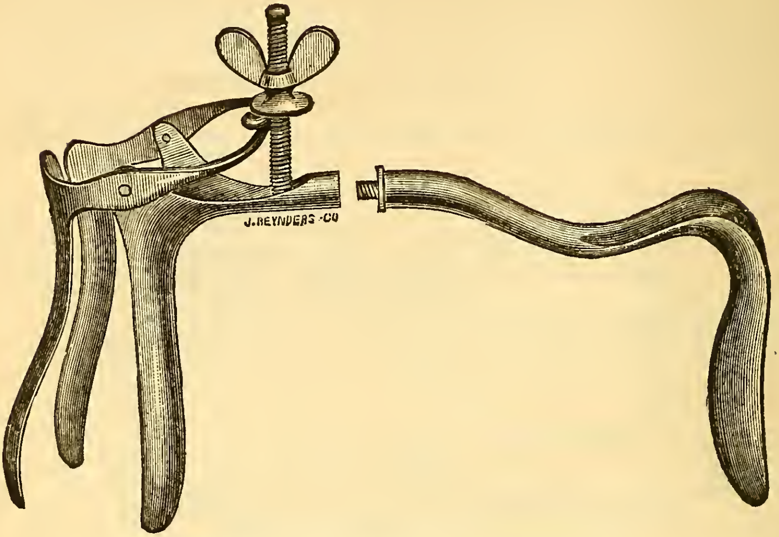

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FIG. 68.—Gillette's combination Sims' and Nott's speculum.

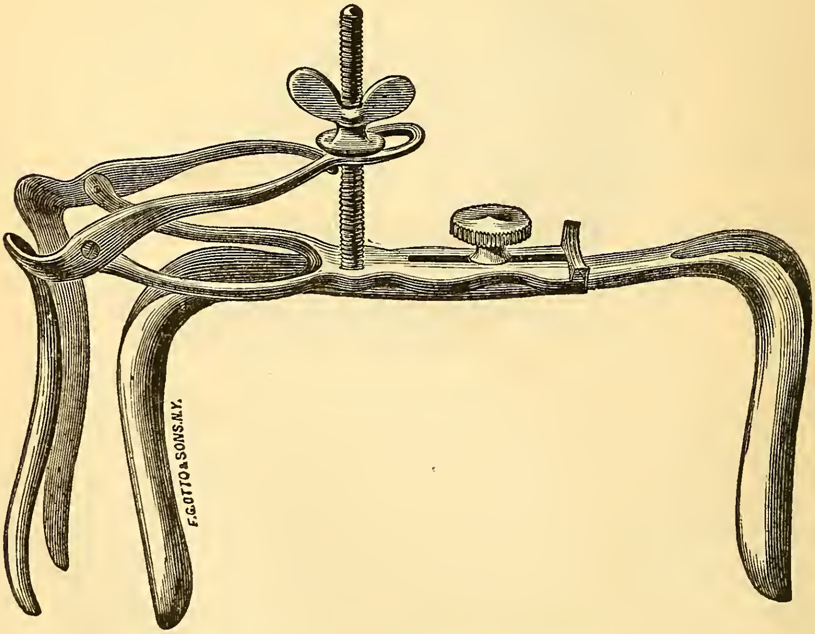
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FIG. 69.—Mundé's combination Sims' and Nott's speculum.

able, and the screws and anterior branches can be removed so as to form a plain Sims. We thus have a combined Sims and Nott, a simple Nott and a simple Sims in one instrument. I can testify to the utility and simplicity of my instrument, having even frequently found it to rest so firmly on the inferior buttock when fully expanded as to enable me to loose my hold on the handle and use both hands for manipulation. The objection to these instruments is the pain which the enormous distention of the vaginal pouch causes (three and a half inches at tip of blades of my speculum); but this objection is overcome by not separating the blades to their limit. An instrument similar in design has also been devised by Dr. Jenks, of Chicago. It is natural that every inventor should be prejudiced in favor of his own instrument and that, indeed, he should succeed better with it than any one else. Being myself guilty of a speculum (for mine was devised independently and before I knew of Dr. Gillette's) it will not seem invidious in me when I say that all these complicated modified Sims specula have not succeeded in becoming popular, and are chiefly used by their inventors. That this is not a proof of their worthlessness, I am firmly convinced. For my part, if I should not succeed in exposing the vagina and cervix, as I wish, and using whatever manipulations are necessary through Thomas' or my combina-

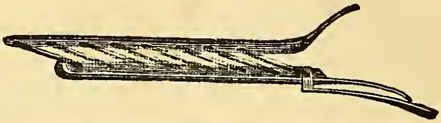


FIG. 70.—Shiland's ring speculum, closed.

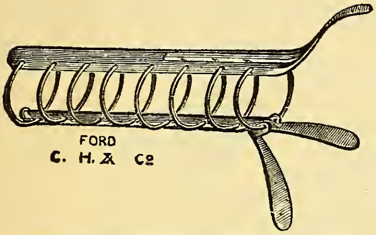


FIG. 71.—Shiland's ring speculum, open.

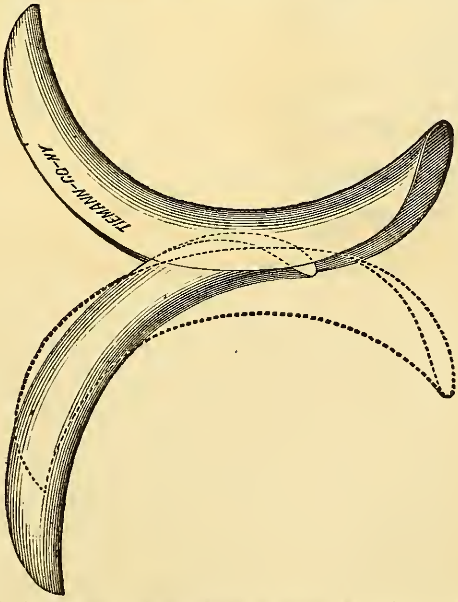
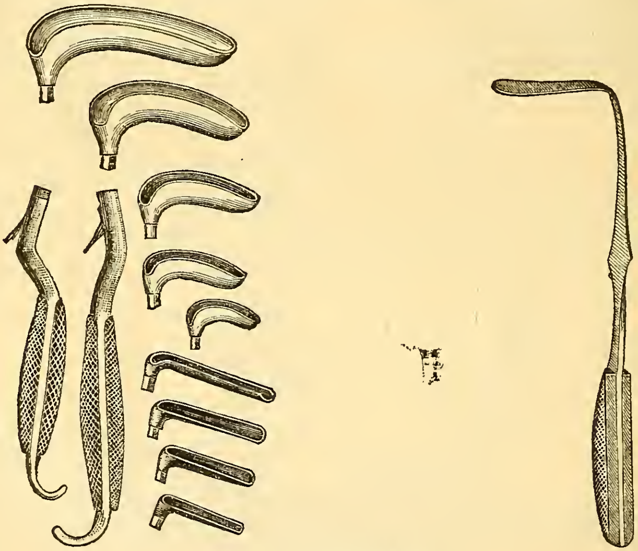


FIG. 72.—Neugebauer's double-crescent speculum, as modified by Barnes.

tion speculum, I should think it useless to try one of the first described complicated contrivances, and at once secure competent assistance.

Other forms of specula.—I shall describe but three other specula, which come under none of the exact heads already mentioned, viz.: Shiland's ring speculum, Neugebauer's double-crescent speculum as modified by Barnes, and Simon's gutter-speculum with vaginal holders. The construction and mechanism, as well as the manner of employing Shiland's speculum, is illustrated by the accompanying cuts. I have never used it, but can see how it might be serviceable in exploring the vaginal walls. Neugebauer's double-crescent speculum (or double shoe-horn speculum, as it might be called) is represented in Fig. 72. It can be used either on the back or in the lateral position, the posterior blade being introduced first and the anterior slipped into it, as shown in the diagram. Both hands are required to hold the blades, which will do for diagnosis, but renders the instrument unsuitable for operations unless an assistant be present to hold one blade. What its advantage over Sims' speculum is does not appear to me, and I do not see in what it surpasses our best large-mouthed bivalves. The necessity for its invention therefore seems doubtful, and I question whether more than two or three gynecologists use it in this country. However, as a bivalve, which it really is, I can conceive of its being useful in many cases, chiefly where very great distention of the cul-de-sac is desired, or (it comes in sets of single blades, from one to four, each blade having a different size at either end) when the vaginal orifice is very narrow and only one blade can be introduced at a time. An objection must always be the immobility of the cervix. Barnes speaks highly of it. I have never used it, nor felt the want of it.



Figs. 73, 74.—Simon's specula.

The construction and mode of employment of Simon's specula and holders is shown in the accompanying diagrams. The specula and plates for supporting the anterior wall come in sets of five different sizes, which are attached to the handles; the flat holders with long handle are used to retract the lateral walls of the vagina. The patient occupies the gluteo-dorsal position, one assistant holds the perineal speculum, another the left leg and the anterior plate, and the left lateral retractor, a third assistant the other leg and the right lateral retractor. An excellent view is thus obtained of the cervix and vaginal pouch, particularly of the anterior wall. This position enabled Simon to attain his marvellous results in operating on large vesico-vaginal fistulæ, and to cure many cases of prolapsus uteri by his posterior colporrhaphy operation. But it is manifestly much less convenient than the Sims position for the assistants, more of whom are required, and the number of instruments needed is also greater; and I can conceive of no operations on cervix or vagina which can be performed more easily through the Simon specula than through the Sims, except only those on the posterior wall of the vagina, in which Simon's method is indispensable. Therefore, the Simon instruments and position have not become popular in this country for cervix or fistula operations.

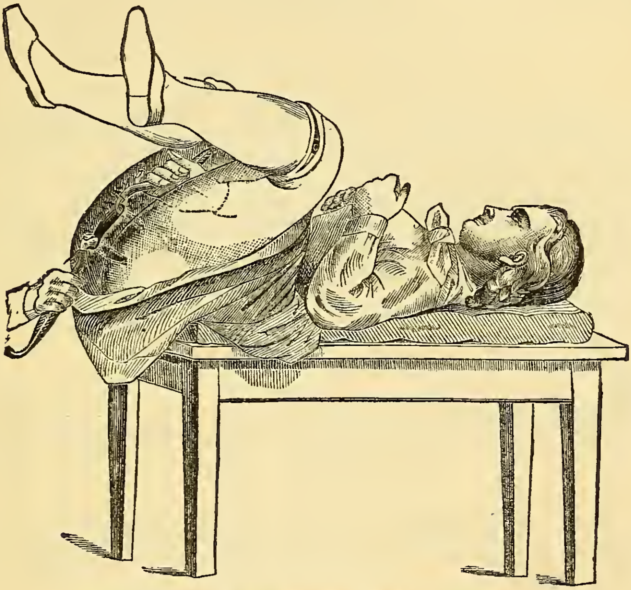


FIG. 75.—Position for and manner of using Simon's specula.

C. *Examination of the Uterus with Sound and Probe.*

There are two varieties of uterine sounds, the flexible and the inflexible.

The flexible are made of whalebone or rubber (elastic), or silver or copper; if the latter, generally silver or nickel plated. Of these flexible metal sounds there are again two kinds: 1. Such as are so flexible as to bend at the slightest obstacle and yield to the pressure caused by an attempt to replace a displaced uterus; and 2. Such as are stiff, but can be molded by the finger, and retain the shape and curve given them despite any ordinary obstacle encountered, such as a sharp flexion, and permit the reposition of the uterus without straightening out. The representative of the former class is the Sims, that of the latter the Simpson sound.

Of these two, I prefer and always use the stiffly flexible Simpson sound, because it is thicker than the Sims and therefore less likely to catch in folds of the cervical mucous membrane, but chiefly because a flexible sound of soft metal is both difficult to introduce and, yielding to every obstacle and following every curve of the uterine canal, gives but little information as to the direction of the canal and the mobility of the uterus. That is to say, when it is introduced by the touch only, which is the manner in which I generally use the sound; if through a Sims speculum, the highly flexible sound or probe are preferable and safer. The precautions always to be observed in using the stiff sound will, I think, justify my preference for it. The Simpson sound is graduated in quarter inches and inches up to six inches from the point, and has a small knob at a distance of two and a half inches from the point, this being the average length of the normal uterine cavity; the uterine portion of the sound is not graduated in order to be perfectly smooth. The point is blunt and slightly expanded.

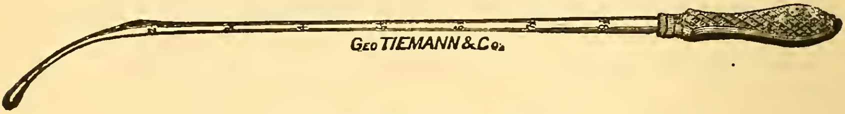


FIG. 76.—Simpson's stiff sound.

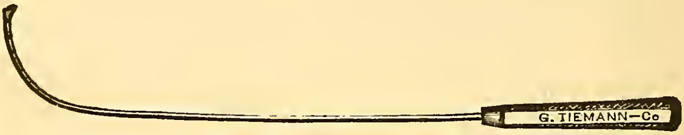


FIG. 77.—Sims' flexible sound.

Another thicker sound of uniform size all through has been devised by Peaslee, who used it to dilate and preserve patulous the uterine canal. It is also graduated, and is very useful besides, in replacing a dislocated uterus, as its thick tip is less likely to injure the fundus.

Very thin, flexible, or elastic rods made of pure silver, whalebone, or hard rubber, are called probes, and are used for precisely what their name implies. While a sound carries a more sonorous tone with it, the probe is simply meant to wind its way into the uterine cavity and gently ascertain the direction of the canal and its length.

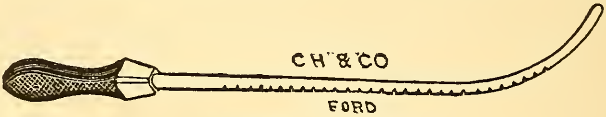


FIG. 78.—Peaslee's thick sound.

The probe ordinarily in use is that of Sims or Emmet; it is so flexible that it is almost impossible to introduce it into the uterine cavity without a speculum, and that it bends at the slightest impediment in the canal. It is of the thickness of an ordinary mandrin of an elastic catheter, and provided with a small knob at the tip. The whalebone or hard-rubber probes are similar in size and shape, and elastic, instead of flexible. Probes are not graduated. All probes are to be used through a speculum, always preferably the duckbill. The regulation length of sounds and probes is one foot from tip to tip, but some elastic sounds are made longer for use in cases of elongation of the uterine cavity, as in fibroids of the uterus.

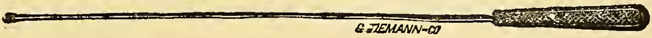


FIG. 79.—Sims-Emmet's flexible silver probe.

A flat whalebone sound with a broad knob at the tip, or a long hard-rubber probe, either attached to a handle, have been devised by Dr. Thomas, for the diagnosis of the existence and attachment of submucous uterine fibroids. These sounds adapt themselves to the narrow space between the projecting tumor and the opposite uterine wall, and by the direction which they take give the examiner an idea of the presence and extent of the tumor.

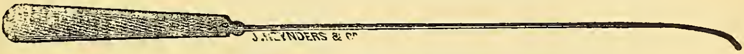


FIG. 80.—Thomas' hard-rubber probe for fibroids.

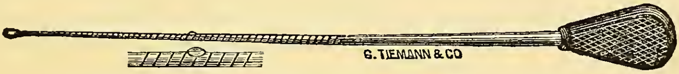


FIG. 81.—Jenks' spiral sound.

A jointed spiral sound has been invented by Dr. E. W. Jenks, of Chicago, for use in tortuous uterine canals (fibroids, etc.). It is hollow and may also be used as a catheter.

Indications and Precautions for the Use of the Sound.

The indications for using the sound or probe may be summed up in the following sentence: *Whenever any information is to be obtained, and a previous careful oral and bimanual examination reveals no counter-indication, particularly if it be a first examination, the sound may be passed into the uterus.* The chief indication, therefore, is the chance of ascertaining something which may be necessary or valuable for the physician to know. This chance will, of course, present itself most frequently in patients whom we have not seen before, and of whose condition we are totally ignorant. Besides, it seems to me, that the same reason enunciated as an indication for a specular examination, applies equally to the introduction of the sound, viz.: that it is our duty to employ every means at our command to obtain a thorough knowledge of the patient's condition, *provided always that such means are not likely to be injurious to the patient.* Acting on this principle and carefully selecting my cases, and eliminating those in whom the least counter-indication, or suspicion of one (to be enumerated hereafter) existed, I have been in the habit since the beginning of my gynecological practice, fully twelve years ago, of exploring the cavity of the uterus with the sound or probe in every patient who came to me for a first consultation. I have thus introduced the sound in at least 5,000 cases, besides certainly as many more times in women upon whom it was passed repeatedly either for diagnosis or for practice, and have for the last five years taught my private students to introduce it as soon as they had acquired sufficient dexterity—and in all these cases I have still to meet with the first case in which inflammatory reaction followed the sounding, or anything more than slight uterine colic, or moderate shock resulted from it. While temporary, suprapubic pain was not unfrequent, uterine colic was rare, and I have met with but two cases in which colic and shock lasting several days ensued, and in both of these cases the patient confessed afterward that the sound had been used once before by other physicians, as it happened expert gynecologists, with the like result. In no instance, but these two, have I had occasion to regret its use—except, I confess, several cases of *very* early pregnancy in which this routine sounding induced miscarriage. Thus, only recently, I sounded a lady at her first visit, who had menstruated exactly three weeks previously, and found no obstacle to the sound; to be sure, the uterus measured three and a quarter inches, but her youngest child was but five months old. Still, as events proved, that lady was two to three weeks pregnant at the time of sounding, began to flow gently several days later, and miscarried about a month later, the ovum presenting the appearance natural to six weeks. In several cases, intentional misstatement was made as to the date of the last menstruation. But, on the other hand, I have repeatedly known the pregnancy to go on after a sounding unwittingly performed. Notwithstanding this occasional tolerance, I should deprecate most emphatically the practice recently proposed by a Western gynecologist to diagnose early pregnancy by the sound.

I am aware that in thus counselling the frequent introduction of the sound, I am advising a course different from that usually recommended. Since the introduction of the sound by Simpson, who was of course its earnest advocate, there have been frequent controversies as to the utility and dangers of the instrument. The majority of modern gynecologists advise its rational, careful employment, and hold that the present development of the methods of bimanual examination render the sound much less necessary than formerly. That is precisely what I also believe and practise. Use it only when necessary and devoid of danger; and it is precisely during a first examination that I claim for it the reason of necessity and utility. I wish it distinctly understood that I do not advise its use in every case, even though it probably may do no harm; that I carefully exclude, so far as possible, all counter-indicating circumstances and conditions; further, that I should permit its use in the cases described by me only by persons experienced in its manipulation, and should forbid it to all such who either are not experts in indagation and bimanual examination, or are novices with the sound. With these restrictions, I think its frequent employment in the cases mentioned, and after the manner to be described by me, is justifiable and useful. I need scarcely say, that the greatest care and delicacy are indispensable features of its introduction. The familiarity with the physical examination of the female sexual organs and the previous knowledge of the position of the uterus and the direction of its canal, which I thus make indispensable conditions for the use of the sound, will naturally restrict its use to those gentlemen whose touch has been sufficiently educated to enable them to practise gynecology intelligently. All others should either avoid the specialty, or hasten to improve their acquaintance with its rudiments. It is for the purpose of fitting gentlemen to use the sound in cases where it alone may settle the diagnosis, that I run the risk necessarily attending its use for practice by inexperienced hands in my private classes.

The *precautions* to be observed in using the uterine sound or probe are chiefly comprised in the two words: delicacy and gentleness. No force whatever should be used either in slipping the sound into the uterine cavity, or in manipulating or rotating it while there. As a rule, the introduction should give pain only when the tip passes through the always narrower internal os or touches the usually tender fundus. Neither should it be followed by a show of blood, except when it was necessary to work the point through the internal os, or the endometrium is hyperemic. If an obstruction is met with at any point of the canal, particularly at the os internum, which the gentle manipulations of a practised hand cannot overcome, the attempt should be abandoned; at least, if persisted in, it should not be considered a simple diagnostic measure. If severe pain is caused, if the patient shows signs of faintness or collapse, the sound should be at once withdrawn, and, if necessary, the proper restoratives administered. A precaution most carefully to be observed is to pass the sound forward very carefully after its tip has passed the internal os, in order first, not to give pain by striking sharply against the fundus, and second, not to risk perforating the uterine wall. It must not be thought, because the tissue of the uterus is ordinarily tough and its closely interlaced fibres possess great power of resistance, that this accident is impossible. There are certain conditions of the uterus in which the organ has retained the soft, pulpy condition of the puerperal state, is in fact subinvoluted, or in which such a condition arises independently of parturition, so called marciditas uteri, in which the sound has been known to perforate the fundus with the greatest facility, even in experienced hands, and appear at the umbilicus, to the horror of the operator. That such accidents have thus far, strange to say, been followed by no evil consequences, should scarcely lead us to neglect every possible precaution to avoid them.

As a rule, it is not advisable, because more or less painful and hazardous, to move the uterus about with the sound, the fulcrum for which is the mucous membrane of the fundus. This maneuvre is often employed, particularly in replacing a displaced uterus, or converting it into the opposite displacement; but a certain amount of risk always accompanies it, and it is not to be recommended for general employment.

In patients who are still suffering or have recently suffered from uterine hemorrhage, the passage of the sound or probe may be indicated with a view to ascertaining the length and dimensions of the uterine cavity and the possible presence of an intra-uterine tumor (submucous fibroid or polypus) as the cause of the flow; but unusual care should be exercised in order not to renew or increase the hemorrhage.

In chronic pelvic cellulitis of the adhesive type, it may occasionally be permissible to introduce the sound, but only when the uterine canal is patulous and straight and the sound glides in without the least effort.

The *information* to be obtained by the introduction of the sound or probe is the following: the patency of the external os, the dimensions of the cervical canal, the size of the internal os, the dimensions of the cavity of the body of the uterus, therefore the dimensions of the whole uterine canal. Further, the sensitiveness of the internal os and fundus uteri; the direction and course of the uterine canal, and consequently the position of the body and fundus of the uterus. Further, the mobility of the uterus, and consequently the presence or absence of adhesions and obscure remains of pelvic peritonitis or cellulitis. Further, the existence of endotrachelitis or endometritis by the character of the discharge, if any, issuing from the external os and attached to the finger or sound on their withdrawal from the vagina. The opening of the external and internal os, possibly the straightening of the canal in flexions, by the sound may thus give exit to retained secretion.

The presence of an intra-uterine growth may be detected by one or the other variety of sounds or probes. The occurrence of actual hemorrhage after the gentle, easy introduction of the sound may indicate an inflamed or congested condition of the endometrium, or the presence of granulations or vegetations, or of a tumor; in conjunction with other pelvic symptoms (lancinating pain, cachexia), perhaps, uterine sarcoma. A few drops of blood very commonly follow even careful sounding and have no practical significance. A tortuous course of the uterine canal is best detected by a flexible probe.

It should be distinctly understood that the sound is NEVER to be introduced until a careful vaginal and bimanual examination has preceded it, upon the results of which the advisability or necessity for the sound must depend. Also, that the position of the uterus should have been previously ascertained by indagation, and the sound relied upon for this purpose only in the complications presently to be mentioned. He who uses the sound to detect the position of the fundus uteri without first having failed to find it by bimanual examination, has entirely mistaken the scope of the instrument or is ignorant of palpation.

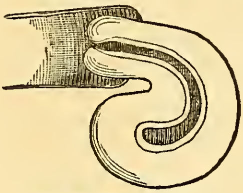


FIG. 82.—Retroflexion.

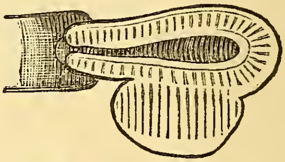


FIG. 83.—Retro-uterine fibroid.

By reversing these cuts an anteflexion and ante-uterine fibroid are shown. (P. F. M.)

Aside from those cases where the introduction of the sound may prove of possible utility, there are numerous instances in which it alone can reveal the whereabouts of the body of the uterus and settle the diagnosis. Such are all cases in which the condition of the abdominal wall prevents effectual bimanual examination, as when the presence of an ante- or a retro-cervical tumor simulates an ante- or a retro-flexion and the situation of the fundus cannot be detected through the abdominal wall; the sound then shows, by its forward or backward or straight direction, whether the case is one of ante-uterine tumor or ante-flexion, or of retro-uterine tumor or retro-flexion. Further, in large abdominal tumors the sound usually settles (there are exceptions to this rule) the diagnosis between ovarian tumors, in which the uterine canal is seldom elongated, and fibro-cysts of the uterus, in which the uterine cavity may attain the length of seven or eight inches.

Counter-indications and dangers.—There are two conditions which absolutely counter-indicate the introduction of the sound or probe, and these are: 1. A suspicion of pregnancy, *i.e.*, the missing of a menstrual period or some other prominent sign; and 2. The presence of acute, subacute, or even chronic inflammation of the pelvic cellular tissue or peritoneum, and acute inflammation of the uterus. If a patient reports having missed a period, even if she be but a few days beyond the time, beware of introducing the sound. Even with this precaution, as already related, an accident may occur, for which certainly the physician is not to blame if the sounding took place before the time of the expected period. Patients will often misinform the physician as to the date of their last period, for the precise purpose of inducing him to do something which may bring about a miscarriage; the previous bimanual examination should have shown the size of the uterus, and led the physician to suspect pregnancy. But, it should be stated in justification of the not altogether unknown accidental production of abortion by experts as well as non-specialists, that the diagnosis of early pregnancy, from six to ten weeks, may be, and at the first-named period always is, a question of great difficulty or impossibility, requiring the most delicate and practised touch. In areolar hyperplasia a slight enlargement, corresponding to a five to seven weeks' pregnancy, may be almost imperceptible, and if the abdominal walls are thick or rigid, or the uterus slightly retroverted, it is generally impossible to grasp the body of the uterus between the fingers and accurately determine its outline. The overlooking of pregnancy up to eight weeks, and the accidental production of abortion by sounding may, therefore, in the exceptional cases mentioned, be excusable, and has probably happened once or oftener to every experienced gynecologist. But it is excusable only when all the proper means of avoiding such a mistake have been employed. I have already stated that the introduction of the sound for the diagnosis of pregnancy (the diagnosis being made by the arrest of the sound by a soft elastic body before entering its normal distance), is entirely reprehensible. Besides, a diagnosis cannot surely be made in this manner, as the sound is quite as likely to slip between uterine wall and membranes to a depth even greater than normal, as to be arrested at the internal os by the ovisac.

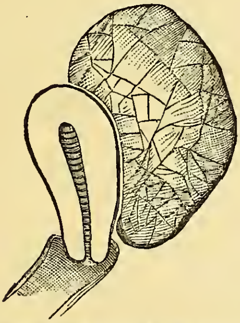


FIG. 84.—Showing normal length of uterine cavity in ovarian tumor. (P. F. M.)

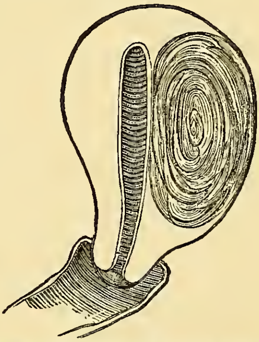


FIG. 85.—Showing elongation of uterine cavity in interstitial fibroid. (P. F. M.)

A probe will naturally, by its small size and flexibility, produce less irritation than a sound, but it should be equally tabooed in the cases named.

The other counter-indication, uterine or pelvic inflammation, must have been detected by the finger, and is quite as absolute as suspected pregnancy. Only in very old cases of cellulitis or peritonitis, in which indurations and contractures in the pelvic cellular tissue are the sole signs of the long distant inflammation, in which, in fact, those residues have taken on a fibrous or cicatricial character, may the cautious introduction of the sound and chiefly of the probe be justifiable; such a course may be necessary when it is important to decide between a retro-uterine tumor (adherent fibroid, or ovary, or cellulitis); and an adherent retro-flexed fundus uteri. Old "chronic metritis," so-called, subinvolution or areolar hyperplasia and chronic or subacute endometritis, do not of course counter-indicate the sound.

The *dangers* attending the introduction of the sound are, the production of uterine colic or actual collapse from shock—a temporary affair—and of inflammatory reaction in the serous or cellular tissue of the pelvis. Uterine colic is not a very uncommon result, and generally lasts but a few hours or less, and passes away without further injury. Collapse from shock is rare; I have never met with it from sounding, but several times from a medicated application to the endometrium. A fatal case of shock from sounding is not known to me. It must be remembered, that every gynecological manipulation is attended with a certain amount of risk and danger; even a simple digital examination has been followed by septicemia originating from a scratch of the cervix by the nail, and a severe peritonitis has resulted from the gentle compression of the peritoneum exercised during a bimanual examination. But such accidents are the rare exception, and if we were to avoid *every* interference with the female sexual organs because an accident *may* possibly happen, we should simply have to give up the local treatment of those organs entirely. Knowing the possibility of such an unexpected accident, we should forestall all reproach by employing the greatest care and delicacy.

A pelvic peritonitis or cellulitis *may* follow any sounding, as it may any intra-uterine application, or even a cauterization of the cervix. Therefore it is always wise, after having for the first time sounded a patient whose peculiarities you are not familiar with, to advise her to remain quiet for several hours after or even for the whole day, until all probability of reaction has disappeared. Indeed, it is advisable, after every sounding or intra-uterine application, even in old patients, to direct them to remain in the anteroom for some time, one-half or one hour, before leaving, and I have in several instances been called to restore ladies from temporary faintness following applications. Such attacks are not always purely physical in origin, but frequently arise from a hysterical tendency. Thus I have seen patients go almost into a convulsion, or break out into a fit of weeping, on the passage of the sound through the internal os, symptoms which subsided as soon as the sound was withdrawn and were followed by no reaction whatever, thus showing their purely nervous nature. I have already stated, under Precautions, that the fundus uteri has repeatedly been perforated by the sound in experienced hands, the uterine tissue in these cases being unusually tender; also, that ordinarily no bad results followed the accident. Some observers believed that the unexpected entrance of the sound to the handle, and the appearance of the point near the umbilicus was to be explained by its having been passed into and through the fallopian tube. While this probably may occur where the uterine mouth of the tube is patulous, the investigations of Liebmann, of Trieste, have shown that the chances are greatly in favor of the perforation. He found that of 100 fresh uteri, twenty-three were perforated by the sound very easily, forty-two easily, eleven with but slight force, and in twenty-four only was actual force required; of these last, eleven uteri were hyperplastic and thirteen normal. As a rule, the uteri of post-climacteric women were more easily perforated. Sims' flexible sound was able to perforate all but the more rigid walls. When there is reason to suspect a friable condition of the uterine tissue (subinvolution, displacement, with venous congestion, fatty degeneration—judging from other organs—or in anemia—senile atrophy, etc.) the sound should either not be passed at all, or a flexible probe or bougie substituted. Even though in the cases reported the perforation did not prove injurious, it can scarcely be considered a harmless matter thus to injure the peritoneum, and all proper precautions should be adopted to avoid it.

From what has already been said it is apparent that the introduction of a flexible probe or bougie is much less irritating and likely to prove injurious in susceptible cases than the sound. The probes and bougies, however, requiring to be passed through a speculum, do not, in my opinion, give as much information as the sound.

Manner of introducing the sound.—I *always* introduce the *sound* by the touch (and *not* through the speculum) whenever a previous digital examination has shown me its probable feasibility, utility, and innocuousness. I prefer to be guided by my finger in this maneuvre rather than by the eye, for with the finger against the cervix, I watch every step of the sound and every corresponding answer of the uterus, beyond the point accessible to the eye, the external os. Every obstacle, every deviation in the direction of the uterine canal is detected and gauged by two practised fingers, and its conquest accomplished and injury prevented by the combined action of two hands. Through the speculum the point of the sound is blindly thrust forward wherever the canal allows it to go, and the valuable information imparted by the mobility and docility of the uterus under the domination of the sound is entirely lost. Introduced through the speculum, even though it be the Sims, the sound shows us only the patency, direction, and length of the uterine canal; but if there be obstacles to its progress, such as rugosities of the cervical mucous membrane, flexions or malposition of the uterus, the instrument will generally fail to pass the obstruction unless force be used or the tenaculum employed to straighten the uterus. Introduced on the finger, however, his practised touch enables the expert, with the aid of the internal finger, to overcome these obstacles and gently and safely pass the sound to the fundus. When the sound is counter-indicated the probe comes into play, and it should be passed only through a Sims speculum. To introduce the sound, as many do, through a tubular or bivalve speculum is unscientific and useless, to say the least.

The patient occupies the dorsal position, the physician stands before her and, having made the ordinary digital and bimanual examination, and found an indication, and no counter-indication for the sound, grasps the handle of the instrument between the tips of the thumb and first two fingers (like a penholder), and gently insinuates its point between the labia. In removing the sound from the basin of warm water, and anointing it, all clatter and display of the instrument should be avoided, as likely to alarm and annoy the patient. It is best not to refer to the intention of sounding at all, but to quietly introduce it under the sheet and merely make a soothing remark when the passage of the internal os or the touching of the fundus gives pain.

The examining finger, with its volar surface upward, rests against the lower lip of the cervix; the sound, with its convexity downward, is passed along the finger until it reaches the cervix, and the point is then gently insinuated into the os, and up the cervical canal until the region of the internal os is reached, that is, about one inch. As soon as the tip of the sound is engaged in the cervical canal, the middle finger is withdrawn from the handle, and the thumb and forefinger alone manage it with the utmost delicacy, scarcely more than touching the handle. If the uterus occupies the usual position of antecurvature, the sound will generally meet with a very slight impediment at the internal os, which is recognized by the expert, and immediately overcome by gently depressing the handle, when the tip will slip over the ring of the internal os and glide at once to the fundus. When the moment arrives to depress the handle in passing the internal os, it is convenient to change the position of the fingers, placing the tip of the thumb on the handle, the index-finger below it. The sensation imparted to the finger of the examiner, when the sound touches the fundus, is that of a soft, semi-elastic resistance; the sensation experienced by the patient is that of a more or less acute pain near the umbilicus, but this only when the sound actually presses against the fundal mucous membrane. That the greatest delicacy is imperative in passing the sound through the internal os, is apparent, when we consider that the distance from that point to the fundus is only 1½″, and that the sudden forcible passage of the apparent obstruction might result in the tip being driven sharply against the sensitive fundus, and perhaps through it. In fact, the less the fundus is irritated by the sound after it has once been touched, the better. The fundus thus reached, and the patency of the uterine canal, and the tenderness of the internal os and fundus noted, the internal finger, which all this time has retained its position against the cervix, is pressed firmly against the sound at the spot where it issues from the os, and the sound is withdrawn with the finger in that position; the

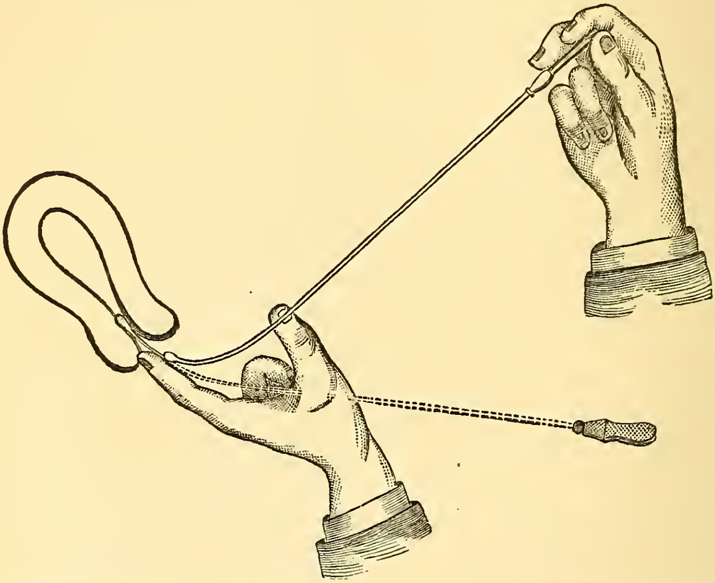


FIG. 86.—Position of hands in introducing the sound into the external os, and change of position as the sound slips through the internal os. (P. F. M.)

point thus marked on the sound will indicate the length of the uterine cavity. In a normal uterus the finger will be arrested at the small knob with which every Simpson sound is provided at a distance of 2½″ from the tip. The approach of this knob should indeed be used as an alarm to the internal finger that the tip of the sound is near, or at the fundus. The character of the secretion attached to the sound and finger, if any, should be noted.

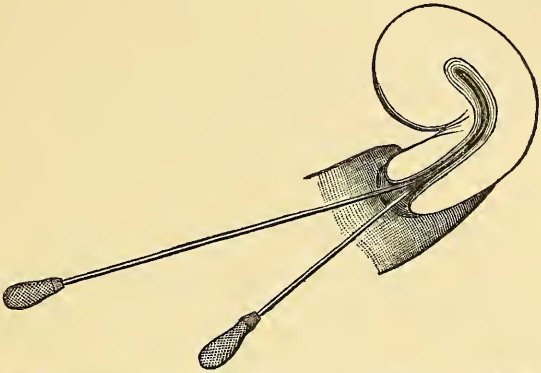


FIG. 87.—Manner of introducing the sound in anteflexion. (P. F. M.)

When the uterus occupies the normal position, and the external and internal os, and whole uterine canal are widely patent, and the latter devoid of entangling rugosities, the passage of the sound is an easy matter, even to the beginner. But, when the cervix is turned far back, or curled up anteriorly, when the external os is scarcely perceptible, or there is a sharp flexion, particularly anteflexion, of the body of the uterus, even the expert may fail at the first attempt. In a very small, or soft, or conical cervix, the external os may be hardly larger than a pin's head at the very apex of the cone, often with velvety lips, and therefore hard to detect and locate. Occasionally the speculum is required. If indagation has shown the uterus to be retrodisplaced, the sound will be introduced about up to the internal os, in the usual manner, and then gently rotated, and the handle raised, instead of being depressed, as in antedisplacement; the point then glides over the internal os, and backward to the fundus, the concavity of the instrument looking backward. If there is an ante- or retro-flexion, the uterine portion of the sound should be bent to correspond to the probable curve of the canal. This is chiefly necessary in anteflexion. Occasionally, however, cases are met with in which even the most acute angle of flexion yields to the normal slight curvature of the sound; this

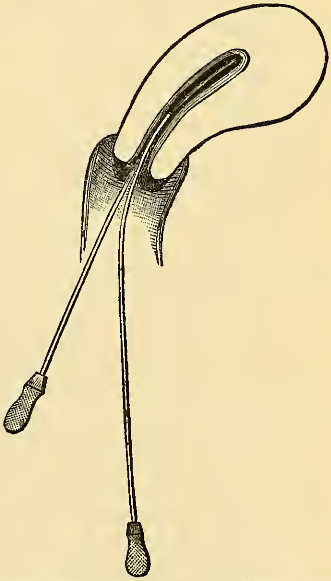


FIG. 88.—Manner of introducing the sound in retroversion. (P. F. M.)

occurs when the flexion is recent, or the uterine tissue is very flaccid or atrophic. Thus I recently saw such a case in a young lady twenty-two years of age, whose flexion was probably due to forced exercise while at boarding-school. Her uterus was flexed in the third degree, cervix and fundus touching; but the sound passed straight to the fundus, encountering almost no obstacle at the angle. As soon as it was withdrawn, the uterus returned to its flexion. A valuable hint for treatment was thus given, viz.: the uselessness of attempting to straighten so flabby a uterus by vaginal supports; a stem, probably a galvanic stem, was needed to straighten and stimulate the uterus to retain its erect shape. This feeling of relaxation of the uterus could never have been imparted by the sound alone through a speculum ; the internal finger was needed to control the sensation.

It not unfrequently happens in apparently normal cases that the point of the sound is arrested in the cervical canal, or at the internal os; the point is then probably caught in some fold or pocket of the mucous membrane, and a little gentle, lateral, and perpendicular pendulum or rotary movement of the handle generally soon overcomes the obstacle. In some instances of anteflexion, I have found the uterus so movable that the mere pressure of the tip of the sound at the internal os, would push the cervix so far back as to prevent the sound from entering the cavity of the uterus; the internal finger may then draw the cervix forward and thus straighten the uterus, or it may go in front of the cervix and push the body back, or the sound is grasped between the thumb and forefinger of the examining hand, and held *in situ*, while the external hand leaves the handle of the sound and presses the fundus back and, as it were, pushes the uterus down over the sound. Of course this must be done very gently.

I have found beginners fail most frequently in passing the internal os, because they neglected to depress the handle sufficiently, or did so too soon before the tip had reached the internal os. In the former cases timidity was generally at fault, and after several ineffectual attempts, they would give it up. Nothing but practice can teach the beginner to appreciate and overcome these difficulties; they can merely be described on paper, their recognition must be learned by experience.

Some authors, (chiefly English) recommend the introduction of the sound by the touch in the lateral position. It can be done, of course; but I fail to see the utility of substituting an inconvenient, and in no way preferable method to one in every way suitable. The sound may also be used through the speculum (Sims', of course), and the length, width, and course of the canal thus ascertained. It will do as well as the probe in all cases where a flexible instrument is not preferable. To ascertain the width of the canal, Peaslee's thick sound is advisable.

The *probe* is introduced only through a speculum, always preferably the Sims. Its flexibility only allows it to follow the direction of the uterine canal; if the latter is particularly tortuous, the probe requires to be bent in various curves, according to the previous examination, until the correct one is finally found and the tip passes the obstruction. This curve, being retained on its withdrawal, gives the course of the uterine canal, a valuable piece of information. The paramount advantage of the probe over the sound is its safety, the slight irritation it produces, the absence of all force. Its disadvantages are the limited information it imparts, the ease with which its flexible or elastic tip is caught in a fold of the cervical mucous membrane, and its progress impeded or prevented, and the necessity of using a speculum through which to introduce it.

It is not necessary to describe the manner of passing the probe through a cylindrical or bivalve speculum, because the maneuvre is exceedingly simple and—because it frequently fails. Through the Sims speculum the method is as follows: The cervix, being exposed, is seized by the tenaculum and gently drawn down, thereby straightening the uterus; the left hand then taking the tenaculum, the right gently slips the probe into the uterus, having given it the curve which a previous examination has indicated. When the probe has reached the fundus, the right index is passed into the vagina, or the dressing forceps grasps the probe at the external os, and thus marks the length of the uterine canal, which must be measured by tape-measure, since the probes are not graduated.

The special indications for the use of the probe are either extreme narrowness or tortuosity of the uterine canal, or the necessity for exceeding gentleness for fear of re-exciting inflammatory processes, which even the probe *may* occasionally do.

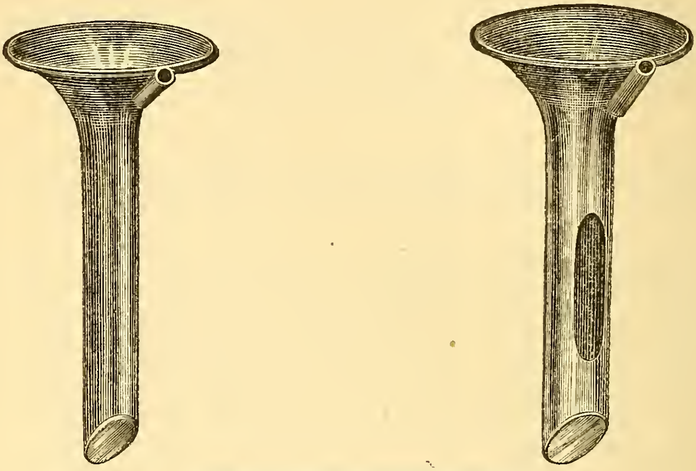
The elastic probes of hard rubber or whalebone are used in very tortuous canals on account of their slenderness and weakness. Thomas's flat whalebone-sound has already been described.

D. *Dilatation of the Uterus for Purposes of Diagnosis (Inspection and Indagation of the Dilated Uterus).*

It frequently becomes necessary, in order to settle a diagnosis, that a view of the endometrium be obtained, or, what is vastly more useful, that the finger be passed into the uterine cavity. In order to do this, the narrow uterine canal, ordinarily passable only for a sound, must be dilated to the width of at least an inch. This may be done by rapid forcible dilatation by means of powerful two or three-branched diverging steel dilators, or by a gradual and slow dilatation with compressed cones of sponge (sponge-tents), swelling bougies of laminaria or tupelo; or again, by rubber tubes into which water is forced from a syringe until they have acquired the desired size. As all these manipulations require a certain amount of preparation, and are also used for therapeutical purposes, I will defer their description to the next chapter, and will only describe here the conditions calling for inspection and indagation of the uterine cavity, and the results of such examination.

The information imparted by inspection of the cervical and uterine cavities, particularly of the latter, is exceedingly meagre. If the cervix is largely dilated, as immediately after abortion, childbirth, or the removal of a sponge-tent, or if it is lacerated, its walls may be separated by a steel dilator and a view of its cavity obtained through a Sims speculum almost up to the os internum ; or the lips may be separated by forcing a tubular or bivalve speculum well up into the cul-de-sac. Useful information as to the color of the endocervical mucous membrane, especially as to the presence of hyperplastic follicles, may be thus obtained. To obtain a view of the upper portion of the cervical and any part of the uterine cavity proper, an instrument is required similar to that devised by Dr. Skene for the bladder. If the internal os is sufficiently dilated to admit one of the sizes of this endoscope, a view of the uterine mucosa, exactly proportionate to the diameter of the tube employed, will be obtained. By means of reflected (artificial) light this small disk may be clearly exposed. But, compared with the information imparted to that real eye of the gynecologist, the tip of his index finger, this glimpse of the endometrium possesses but little value. With the cervix once dilated sufficiently to admit the endoscope, it will be found vastly more useful to pass the finger into the uterine cavity and *touch* its whole surface, than to *see* one small disk one-half to one inch in diameter. For it must be remembered that the tube cannot be shifted and pointed in different directions, as in the large sac of the bladder.

Passing the point of the index into the cervical canal, and crowding down the fundus with the external hand, or drawing down the uterus with a double tenaculum inserted into the cervix, the finger first feels the endocervical mucosa, its roughness or smoothness, chiefly the condition of the follicles. If these are enlarged and the mucosa unusually rugous, the endocervicitis and the stringy discharge which then doubtless exists, will not be curable by caustics, or mild applications, but require the removal of the hyperplastic tissue by the sharp curette. Other pathological conditions, except perhaps a mucous or fibrous polypus, or a sacculated enlargement of the cervical canal, are not met with between external and internal os. A malignant degeneration of the cervix can always be detected by the external touch of that part, and submucous fibroids in the tissue of the cervix alone and growing only toward that cavity are very rare. Disease of the mucous membrane or muscular tissue of the body of the uterus, is frequently met with and often recognizable only by the finger in the uterine cavity. It is true that by the aid of the curette and whalebone probes degeneration of the mucosa and submucous tumors may usually be recognized, but a positive diagnosis or confirmation can at times be obtained only by the finger. The pathological conditions thus calling for uterine indagation are, benign or malignant degeneration of the mucosa (hyperplastic pulpy condition of membrane, vegetations ; diffuse or circumscribed sarcoma), submucous or interstitial fibroids and polypi, and retained portions of membranes or placenta (generally after miscarriage). The removal of small portions of the mucous membrane or pathological growth (sarcoma, or placenta) and their examination under the microscope will generally clear the diagnosis without doubt ; but in fibroids indagation is often the only means of ascertaining



FIGS. 89, 90.—Barnes' uterine endoscope.

the presence, size, and attachment of the tumor. Thus, in differentiating between inversion of the uterus, and a fibroid polypus with thick pedicle, the finger alone can decide from which side the polypus springs, if it proves not to be an inversion.

E. *Examination of the Uterus with the Curette for Diagnostic Purposes.*

In disease of the endometrium it is often impossible to make a diagnosis without a macro- or microscopical examination of the affected tissue. I have already shown that an ocular inspection of the uterine cavity is limited and unsatisfactory ; the only other means at our disposal are, therefore, to bring the diseased tissue, or a portion of it, where we can examine it at our leisure. This is done by introducing a spoon-shaped instrument with cutting or dull edges and removing a small portion of the mucous membrane or tumor ; the character of the disease may be apparent at a glance, as in the common polypoid vegetations and granulations, and the diffuse pulpy hyperplasia of the mucous membrane ; or other symptoms may call for microscopical examination, as in sarcoma. The curettes first devised and employed had semi-acute or cutting edges; Récamier's and Sims' curettes are representatives of this class.

The sharp edges, while invaluable where it is desired to cut deeply and remove all the diseased tissue, are obviously dangerous and certainly unnecessary when only a superficial shaving or a small particle is to be removed for purposes of diagnosis. The later instrument of Thomas is therefore greatly to be preferred to the sharp curettes, and answers every purpose. It is made of flexible copper wire, the loop being flattened on one surface so as to give it a dull edge, and the thinness of the wire at the neck of the loop and close to the handle renders the instrument almost incapable of sufficient impression to do injury. The loop in the smallest size made is one-sixth of an inch broad, but a loop of one-fourth inch is the size usually employed. The instrument is nine inches long, three inches and a half of which form the wooden handle, which is roughened on the surface corresponding to the scraping surface of the loop ; the wire is one-sixth of an inch thick near the handle, and tapers down from one-twelfth to one-sixteenth of an inch thick at the inception of the loop. (See Chapter on Therapeutic Curetting.)

Indications.—The *one* indication for the blunt curette as a means of diagnosis (I entirely omit the sharp curettes for this purpose) is the existence of pathological hemorrhage from the cavity of the uterus—menorrhagia or metrorrhagia—for which no adequate cause, constitutional or local, can be detected by the ordinary methods of exploration, and which has resisted the usual remedies. Experience has shown us that such uterine hemorrhage is very often due to the irritation produced by small wart-like or polypoid growths in the uterine cavity, or to a pulpy, hyperplastic, and hyperemic friable condition of the mucous membrane, or to a granular condition of its surface similar to that of a varicose ulcer ; or, finally, to the retention of often very minute fragments of adherent placenta after miscarriage. Diffuse sarcoma of the mucous membrane is a rare affection, but as fatal as it is rare. Again, true cancerous degeneration of the mucous membrane of the cavity of the uterus proper occasionally occurs. In sarcoma and carcinoma of the body of the uterus the pelvic pains and cachexia will give some suspicion of the true nature of the case ; but the hemorrhage after all is the main symptom, and the positive diagnosis can be made only by a microscopical examination of the diseased mass.

In all these cases the curette is indicated and will rarely fail. The withdrawal of small jelly-like bodies of a pale pink translucent color, and of the size of a canary-seed, or slightly larger, shows the presence of the condition known as endometritis polyposa. If thin slices of a pulpy tissue are removed, we have endometritis hyperplastica; if merely stringy mucus, mixed with blood and shreds, comes away with the curette, we have endometritis granulosa or hemorrhagica; if small, firm masses of the size of a pea or bean are removed, the hemorrhage was due to retention of adherent placental villi; if, finally, friable, spongy parti-colored masses are removed, especially if abundant, and perhaps offensive, the probability of malignant disease is great. Of course, such brief and general characteristics I have here given cannot be considered pathognostic; the microscope can alone make the *positive* diagnosis, and I should advise that its decision be invoked in every case coming under this category before pronouncing either a diagnosis or a prognosis.

The peculiar sensation imparted to the finger on drawing the curette over the endometrium may give some hint as to the nature of the affection: if it is a grating, vegetations or placental fragments; if soft, spongy, one of the other conditions.

Counter-indications are all conditions which would prohibit any interference with the endometrium, even sounding or probing, in fact all present or recent inflammatory trouble in or about the uterus.

Operation.—The smallest size of blunt curette ($\frac{1}{6}$ inch loop) can generally be passed through every uterine canal, at least in women who have had a bloody or mucous discharge from the uterus for some time; for such a flow generally relaxes and dilates the canal. In case an obstacle is met with, and that will generally be at the internal os, the canal should be gently dilated with a steel or graduated dilator, or, in case of excessive rigidity, laminaria or sponge-tents may be required. For ordinary diagnostic curetting I do not remember ever needing more than rapid dilatation with a two-branched instrument, to render the canal passable.

The curette may be introduced simply by the touch, but the removal and preservation of the products of the scraping would then be difficult. It is therefore always advisable to practise the curetting through a speculum, and then always a large bivalve or the Sims. A very large, tubular speculum might possibly do, but the curette is really too short to be properly handled in that way. A bivalve is better, and will answer for many cases; but I, it need hardly be said, prefer the Sims in this, as in every measure requiring a speculum. I shall, therefore, describe the operation through the latter instrument, since through the tubular and bivalve specula it consists merely in thrusting the properly bent curette up to the fundus, and withdrawing it with whatever comes with it. I must, however, admit that, in the absence of assistance, a bivalve will do for diagnostic curetting; for the therapeutical use of the scoop I should not recommend it.

The cervix being exposed through Sims' speculum, the anterior lip is seized with a tenaculum, and the uterus gently drawn down so as to straighten it; the probe or sound is passed to the fundus, and the direction and length of the canal and curve of the sound noted. I prefer the sound for this exploration, as it gives me a better idea of the width of the canal. The curette is then bent in the curve indicated by the sounding, seized between thumb and two fingers of the right hand, and gently passed through the cervical canal and internal os. Arrived at the fundus, the curette is drawn gently (with thumb and index) downward toward the internal os, taking successively the anterior, two lateral, and posterior surfaces of the uterus. The direction of the flattened, scraping surface is recognized by the corresponding roughness on the handle; of course the curette is bent so as to bring the scraping surface to correspond with the concavity of the shank. The four surfaces having been gently scraped, note being taken of the sensation thereby imparted to the fingers, the curette is withdrawn. With it there will generally be a slight oozing, in the midst of which will be found the results of the scraping, if there be any. The blood is wiped up with a bit of cotton-batting on the uterine dressing forceps, and carefully examined. If any of the substances above described have been removed, they will easily be recognized on the cotton by their characteristic appearance, and can be overlooked or mistaken for blood only through carelessness or ignorance. If nothing whatever but clear semicoagulated or fluid blood and mucus appears on the cotton at first, the vagina should be again wiped out with fresh cotton, and perhaps a cotton-wrapped applicator may be passed to the fundus, on which the débris may be withdrawn. Occasionally the exploration is entirely negative, and then a point in the diagnosis is gained by elimination of intra-uterine disease.

A *diagnostic* curetting, done gently and *lege artis*, can be performed with as little risk as the introduction of the sound, and the patient be allowed to go about her usual duties soon afterward. The precaution of rest and care for several hours, of course, applies to this maneuvre even more than to the sound.

I have employed the curette in this way many times, and have never seen any other reaction than a slight, bloody oozing for a day or two. I always do it in my office or the out-door clinic. Any extra caution in the way of keeping the patient in bed or on the lounge for the rest of the day can but be commended, if the medical attendant or the patient see fit.

F. *Artificial Prolapsus of the Uterus for Diagnostic Purposes.*

It has already been mentioned that the uterus can be seized by the single tenaculum and slightly drawn down and straightened, during an examination with the Sims speculum. A gentle traction of this kind requires no force whatever, and can do no harm; its object really is more to steady the cervix and bring it in the line of vision than to draw it down.

But cases are not uncommonly met with in which it is desirable or necessary to dislocate the uterus downward to its utmost limit for purposes of diagnosis or treatment. Such cases are those in which the finger is to be passed into the uterine cavity; or into the rectum or bladder, or both, in order to make the diagnosis of retro- or ante-uterine growths or differentiate between inversion of the uterus and fibroid polypus, by reaching the infundibulum of the inverted organ. For therapeutical purposes the artificial prolapsus is practised during the removal of intra-uterine growths (fibroids, polypi), during the operation for laceration of the cervix uteri, amputation of the cervix, and extirpation of the entire uterus per vaginam.

The cervix of the normally movable uterus may be drawn down to the vulva by seizing it with a double tenaculum or a double-pronged hook. Or the more powerful vulsella may be used. If Hanks' double tenaculum is used, the cervix may be seized either by one lip, or both lips are grasped from within; with Noeggerath's instrument the grasp must be from within. The hooks may be fixed either by the touch or through the Sims or Simon speculum (the only available specula for this maneuvre). If the prolapsus is to facilitate indagation, a speculum is not necessary. If for operation, the Sims or Simon is indicated. Occasionally indagation may be practised on the uterus when it is drawn down in the speculum. When the traction ceases, the uterus rapidly returns to its site. A supposed inverted uterus is best drawn down by passing a broad tape about the pedicle and using it as a means of traction. A wire or thread loop may also be passed through one or the other lips of the cervix and used as a tractile force.

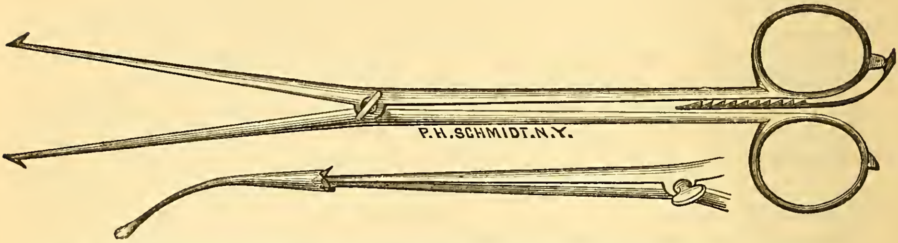


Fig. 91.—Noeggerath's vulsella-forceps for dislocating uterus downward; also with sound attached for lateral dislocation.

Counter-indications to this practice are fresh or chronic inflammatory deposits about the uterus ; the latter, indeed, may fix the organ so firmly as to render its protraction impossible, while the former make it exceedingly dangerous. Occasionally an inflammatory reaction follows the artificial prolapse of even the normally mobile uterus. This method should therefore never be employed needlessly, and only when the examination or operation cannot be as well performed with the uterus *in situ*.

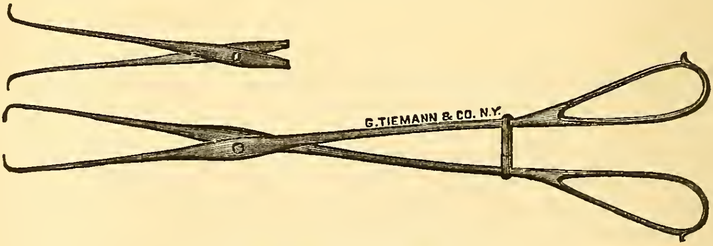


Fig. 92.—Hanks' double tenaculum.

In this connection it will not be amiss to refer to the injuries which may be inflicted on the cervix by the single or double tenaculum. One of the objections advanced against the Sims speculum by those conservative gynecologists who have never really acquired the knowledge how to use it, is the wounding and laceration of the cervix by the tenaculum required to attract and steady the uterus; such lacerations, they claim, besides being a needless disfigurement, open the channel to septic infection, and may be followed by severe hemorrhage. It is true, the cervix is occasionally quite severely torn by the tenaculum, but this accident is usually more annoying to the physician, who again and again loses his hold on the brittle and friable tissue of the part, than injurious to the patient. In the normal cervix the tenaculum (at least the properly curved tenaculum shown in Fig. 50) rarely tears out when properly implanted; and, to my knowledge, no injurious results whatever have ever followed this simple puncture. In those cases in which the hook tears out, and gashes are made in the cervix, the latter is generally in a condition of so-called "cystic hyperplasia," its tissue and surface interspersed with distended mucous follicles, the friable walls of which afford almost no resistance to traction by the hook. Such gashes are always superficial and, emptying as they do the distended follicles, rather do good than harm, accomplishing what systematic puncture and scarification is employed for. I have never seen the slightest ill-effects follow any of the innumerable tenaculum-punctures which I have inflicted. Occasionally, an ectatic vein may be pricked by the tenaculum, and quite profuse hemorrhage occur, but this is instantly arrested by a cotton tampon, steeped in an alum or tannin solution if necessary.

G. *Examination of the Rectum with the Speculum.*

Various bi- and tri-valve specula for the rectum are for sale and more or less used, but they possess, in reality, no advantages over two Sims specula, one for the anterior, and one for the posterior wall; or a simple Ferguson or hard-rubber cylindrical vaginal speculum will answer admirably for many purposes. The principle intended in Thebaud's sphincter ani dilator is precisely identical with that of the two Sims above mentioned.

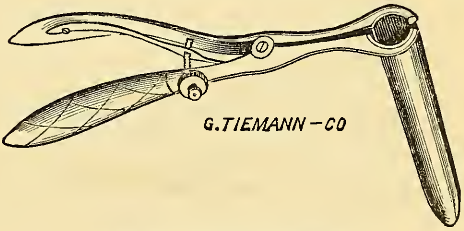


FIG. 93.—Bivalve anal speculum.

Indications.—Whenever deep-seated disease of the rectum is suspected, and the digital eversion of the lower two inches of the gut through the vagina does not reveal the trouble, a specular examination is called for. Such deeper-seated disease may be a stricture, a recto-vaginal fistula, a fistulous opening of a pelvic abscess, an ulcer, internal hemorrhoids, or a catarrhal inflammation of the rectal mucosa, a proctitis. One or the other of these affections is not unfrequently met with as a complication of uterine disease, and the indication, therefore, frequently arises for a rectal examination as a means of detecting the source of rectal aches, pains, or discharges. Painful defecation, and the discharge of mucous or purulent matter from the rectum perhaps gives the most frequent incentive to such a course.

Operation.—As even the digital eversion of the rectum from the vagina gives some pain, chiefly through the dilatation of the sphincter ani in forcing the anterior rectal wall through it, so will the distention of the sphincter by a speculum be exceedingly painful, and require the administration of an anesthetic. A mere preparatory inspection of the lower half of the rectum through a smallest sized tubular, bivalve, or Sims speculum can thus be made without injuring or previously dilating the sphincter ani. But a clear view of the canal can only be obtained by introducing a large instrument, and this requires a painful stretching of the sphincter, which is rarely practicable without anesthesia.

The patient, being anesthetized, is placed in the lateral position (I prefer the left for this, as for almost every manipulation in the lateral decubitus) and a medium cylindrical speculum forced through the sphincter into the rectum. If the resistance of the sphincter is once overcome, the expanded rectum offers no obstacle to the progress of the tube up to its hilt. Should the sphincter oppose the introduction of the speculum, it will either be necessary to make the examination with a dilating speculum or with two small Sims, which are readily passed through a normally contracted sphincter ani (one anterior, the other posterior); or, if the view thus obtained is not sufficient, the forcible hyperdistention of the sphincter should precede the examination, provided the necessity for the latter calls for so severe a measure. This hyperdistention of the sphincter is very rapidly performed, by introducing the two thumbs up to the root into the rectum, placing the four fingers of either hand on each natis, and steadily and forcibly separating the thumbs until they are arrested by the tuber ischii on each side. The anus then becomes a yawning cavity of at least three inches diameter, and the red, pouting rectal mucosa bursts into view to the depth of three or four inches. The external and internal sphincter may be merely stretched and temporarily paralyzed, or their fibres are entirely or partly torn; the mucous border of the anus is generally nicked in several places, and there may be slight hemorrhage. The consequences of the operation are none but beneficial when it is employed for therapeutical purposes (as for the cure of fissure of the anus, for which it is a specific) and innocuous when used as a means of diagnosis; the incontinence following it rarely lasts longer than a few days. The field of vision opened by this hyperdilatation may render a further specular examination unnecessary; but generally the mucous membrane falls forward so as to obscure the unobstructed view, and a speculum or retractors are required to separate the walls.

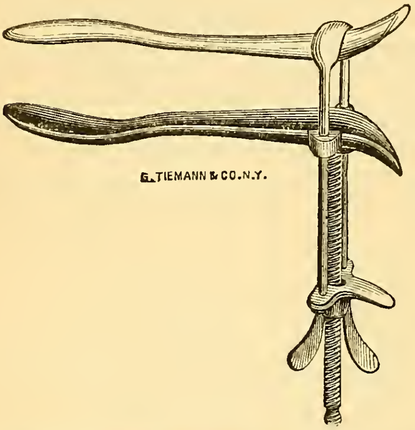


Fig. 94.—Thebaud's sphincter ani dilator for forcible dilatation.

A large-sized cylinder will now afford a good view, which can likewise be obtained through two Sims specula, one retracting the posterior, and the other the anterior wall of the rectum. To view successively the whole circumference of the rectal tube without obstruction by the blade of a speculum, a cylinder is perhaps preferable to the two Sims.

It should be noted that the mucous membrane of the rectum is of a bright red color, not pale pink like the vagina. If it has a bluish or dark red color, however, it is congested or inflamed, and in need of treatment; so, also, if it is coated with thick, stringy mucus.

Applications of fluid medicinal substances may be made either through the cylindrical or double Sims specula. If the cylinder is used, the fluid may be poured into the speculum and brought in contact with the interior of the rectum by withdrawing the speculum or mopping it on the mucous membrane with a sponge on a holder, or cotton on a whalebone stick; the latter is also the method of applying fluid agents through the Sims. Powders (iodoform, bismuth, etc.), may likewise be applied in this way, or by insufflation. Solid substances, such as the stick of silver nitrate to distinct spots, as ulcers or chancres, are best applied through the two Sims, as indeed, nitric acid on a stick when also used to touch ulcers. If a stricture close above or at the internal sphincter, interferes with the examination, it should be divided or dilated. If the examination is repeated within a week it will generally be found easy to dilate the sphincter with the speculum, without the forcible overdistention first employed; later, the normal contraction of the muscle will, in the vast majority of cases, have returned.

The importance of inspection and local treatment of the rectum has been recognized only within recent years, and is particularly to be insisted on in the female sex, in whom affections above the internal sphincter are more common than in the male and (such as catarrhal inflammation, stricture, internal hemorrhoids, internal pelvic fistulæ) either simulate or are closely connected with and productive of uterine disease.

H. *Mensuration of the Abdomen and Pelvis.*

The measurement of the female pelvis is ordinarily useful only during pregnancy as a prognostic sign of impending labor. But during the non-puerperal condition it may, at times, be valuable in cases of large, fibroid tumors of the uterus, when the question of removal of the growth per vaginam is under discussion. A growth of moderate size may be removed entire, but in a contracted pelvis its previous segmentation would probably be necessary.

The mensuration of the abdomen, on the other hand, is of decided importance in gynecology. It is chiefly useful in determining the dimensions of that cavity in uterine and ovarian tumors, and the relative distention of different portions of the cavity. Measurements may be made either with a tape-measure, or with calipers. The chief measurements are the following:

Circumference at umbilicus or at highest point of abdomen.
Distance from ensiform process to symphysis pubis.
Distance from ensiform process to umbilicus.
Distance from umbilicus to symphysis.
Distance from umbilicus to anterior superior spinous process of ilium of either side.
Distance from linea alba to corresponding spinous process of vertebra.

By repeating these measurements at intervals, the degree and manner of the growth of the abdomen may be controlled. Thus, one-half of the abdomen may grow more and faster than the other, or the distance between xyphoid process and symphysis may vary, according to the position of the tumor on one side or the other.

All measurements should be taken on the bare skin, after evacuation of bladder and rectum. The patient occupies the recumbent position; the erect posture is neither so convenient nor decent, and offers no advantages except the greater projection of the abdomen, which may mislead the examiner. The tape-measure should be exactly contiguous to the skin and not indent it; a flexible lead measure may be usefully employed to obtain the exact dimensions and shape, a cast of one-half of the abdominal outline. Hegar and Kaltenbach point out that in ascites and tympanites the curved line is that of a circle, while in abdominal tumors the line is irregular or like the segment of a cone.

I. Aspiration of Abdominal and Pelvic Tumors.

In many cases of abdominal and pelvic tumors it is impossible to make a diagnosis of the nature of a tumor, whether its contents are solid or fluid, and if the latter, whether it is serum or pus or blood, by the rational signs and diagnostic means (palpation, percussion, indagation, etc.), already described. Fortunately, we have in the exploring needle an instrument which enables us to solve the problem in a large proportion of cases. This instrument has been in use many years, and consists in a slender hollow needle not larger than a thick sewing-needle, and from two inches to six inches long, which is thrust into the tumor, and through which a drop or more of the fluid oozes, if there be fluid in the growth. Such minute punctures were not productive of harm in so far as the mere wound was concerned. But, they were often followed by serious results in consequence of the entrance of air through the open tube, the ensuing decomposition of the cyst-contents, and speedy septicemia and death. Besides, in many instances the fluid was too thick or the intracystic pressure not sufficiently strong to force the fluid through the needle, and the diagnosis therefore failed. For these reasons a complicated contrivance was devised and called an aspirator, which permitted the removal of as much of the fluid as was desired with the absolute exclusion of air. The instrument now in common use is that of Dieulafoy or one of its modifications. It consists of a syringe with double current stopcock, one current leading to a flexible tube to which the hollow needle is attached, the other to a second tube which empties in an air-tight bottle into which the fluid removed from the tumor is pressed by simply closing the respective tube when the syringe has been drawn full, and pushing down the piston of the syringe.

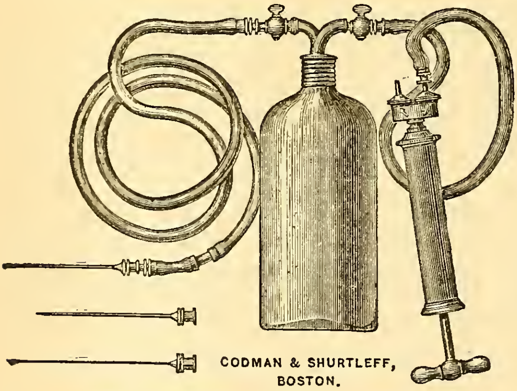


Fig. 95.—Modified Dieulafoy's aspirator.

The aspiration may be either partial, for diagnosis only, or be continued until the tumor is emptied of its fluid contents. There are three or four needles of different sizes with each instrument, the smallest of which is about as thick as a large sewing-needle (for thin fluids), the largest larger than a thick knitting-needle (for thick fluids, like pus and some ovarian fluids).

Abdominal tumors, which often defy the ordinary diagnostic resources, are ovarian cysts, cysts of the broad ligament, and fibro-cysts of the uterus. The differential diagnosis between these three varieties is often a matter of the greatest difficulty. Only by a microscopical and chemical examination of the fluid removed by the aspirator can the diagnosis be made in many cases, and upon this depends the treatment, which in these cases is usually a question of life or death. In ovarian cysts the fluid is generally straw-colored, often brownish, like chocolate, viscid, coagulating by heat and nitric acid, containing a large amount of albumen ; the microscope shows, besides pavement epithelium and granular and fatty matter, a peculiar granular cell; the "ovarian corpuscle" first discovered by Drysdale of Philadelphia, and by him declared pathognostic. The fluid of cysts of the broad ligament is mostly clear, like water, not viscid, contains no granular cells, and does not coagulate, possessing only a rather mystical albuminoid substance, the metalbumen. Fibro-cysts of the uterus again contain a light yellow, thin, non-viscid fluid, which possesses no special characteristics. Besides these actual tumors, there are other conditions of the abdominal cavity which simulate tumors, and require the aspirator needle to make the differential diagnosis. Such are ordinary ascites, and extra-uterine pregnancy with death of the fetus. The non-viscidity, clear, very light yellow color of the fluid and its coagulation on standing, will serve to point out ascites, without the microscope, which would reveal nothing except perhaps large tesselated epithelium from the peritoneum. In old extra-uterine pregnancy the diagnosis is less easy ; pus may be found, but in several cases the "pathognostic" ovarian corpuscle has also been detected. Drysdale himself claims to be able to decide any case in the fluid of which he himself discovers the corpuscle to be ovarian, and he has never missed, I believe ; but others have not been

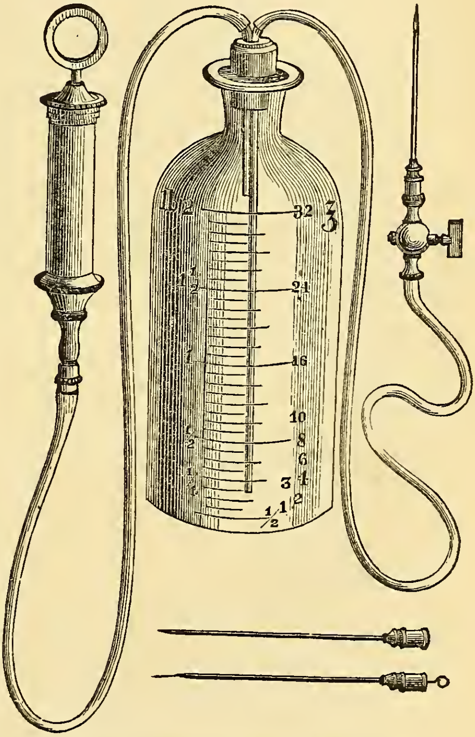


Fig. 96.—Modified Dieulafoy's aspirator.

so successful, and have found the corpuscle in the fluid from abdominal pregnancy and uterine cysts.

Besides tumors springing from the sexual organs, cysts of the liver, kidney, mesentery, and encysted peritonitic abscess, may simulate the former and require aspiration. Thus in a cyst of the liver only the aspiration of a bright yellow fluid, which under the microscope showed liver-cells, enabled me to differentiate the case from an ovarian cyst.

In pelvic tumors, which are detected and reached only or best through the vagina, the aspirator-needle is often quite as valuable an auxiliary to diagnosis. It enables us to determine whether a tense elastic tumor in the broad ligament contains serum, is in fact a beginning ovarian or ligament cyst, or whether its contents are deep-seated pus. It reveals to us the nature of a large, doughy, retro-uterine swelling, whether it is the result of an intraperitoneal effusion of blood (hematocele), or whether pus has formed in an exudation of plastic lymph. It enables us, finally, to detect the cause of the rigors, increased pulse and temperature, and general cachexia, in a patient with an old obscure pelvic cellulitis in one broad ligament or the other, by showing us that the peculiar boggy feel of the exudation tumor and its persistence in spite of all treatment are due to the presence of a small quantity (often not more than one ounce) of thick pus deep within the exudation, the removal of which through that very aspirator-needle rapidly cures the patient. I have recently been using the aspirator in this particular class of cases with the most gratifying results, having cured previously intractable cases of pelvic cellulitis, in which the swelling had persisted for several months and the cause had not been suspected, within a few weeks by simply removing an ounce or two of pus per vaginam.

The introduction of the aspirator-needle is exceedingly simple. If it is desired to aspirate an *abdominal tumor*, it is merely necessary to select a spot where percussion shows the absence of intestines or other vital organs, and where palpation renders the presence of fluid probable, and there plunge the needle (using, of course, the finest size likely to be successful) to its hilt into the growth. Accordingly as the object is diagnosis or removal of all the fluid, will the aspiration be confined to one syringeful, or continued until the cyst is empty. After withdrawing the needle a bit of adhesive plaster is placed over the minute puncture.

In spite of the ease with which the aspiration through the abdominal wall is made, the small size of the opening (if, as always should be done, the smallest sized needle is used), and the tolerance of the peritoneum to injuries now-a-days, a number of instances have been reported in which careful aspiration of ovarian tumors was followed by peritonitis, decomposition of the contents of the tumor, and death. I myself had such a case, and was obliged to perform ovariotomy in the height of a furious septic peritonitis, prolonging life by only six days. Consequently it was proposed by Dr. Henry F. Walker, of New York, always to use the hypodermic syringe for *diagnostic* aspiration, and this is the instrument now almost entirely used for the purpose. Ordinary ovarian fluid, of not too great viscidity, will flow through the hypodermic needle. Even from this slight injury one case of (not fatal) peritonitis has been reported by Fauntleroy of Virginia.

Through the vagina the operation is slightly more difficult, in accordance with the diminished accessibility of the swelling. The aspirator needle may either be passed in on the finger, care being taken to avoid injuring the woman unnecessarily or pricking one's own finger (this may be avoided by guarding the needle point with a small cork which is slipped off when the vaginal roof is reached) ; or the vaginal walls may be freely exposed with a Sims speculum and the needle inserted through it in the spot previously determined by the touch and palpation. The important point is to make out the exact spot where the presence of fluid seems most probable, and remembering it, insert the needle there, and gently but firmly thrust it upward in the direction in which previous exploration has shown the bulk of the swelling to be situated. In inserting the needle care should be taken to avoid puncturing one of the large arterial branches which are easily felt pulsating in the roof of the vagina. When the needle has penetrated as far as seems advisable, judging by the size of the tumor, the piston of the syringe may be drawn back (it is well to have an assistant to do this, while the operator steadies the needle and tube), and the expression of the contents into the bottle will show whether the tumor contains fluid and what it is. If the first attempt is unsuccessful, the needle may be thrust in a little deeper, or in a different direction; indeed, I have repeatedly reintroduced the needle as often as seven or eight times at the same sitting, finding a little pus at each puncture, until the whole supply was exhausted. In such cases no doubt there were a number of small abscesses.

In passing the needle through the vagina into a swelling above the vaginal roof I decidedly prefer to guide the needle on my finger, because by doing so I can be very much more certain that I am introducing it in the right direction, and how far it is inserted, besides being able to steady the swelling and press it gently down against the needle with the other hand on the abdomen.

Generally, when the needle has struck pus, the sudden cessation of all resistance is marked and the point can be freely moved about in the cavity of the abscess, if it contains at least half an ounce. Often the intervening plastic lymph is so dense as to creak almost like cartilage as the needle is forced through it.

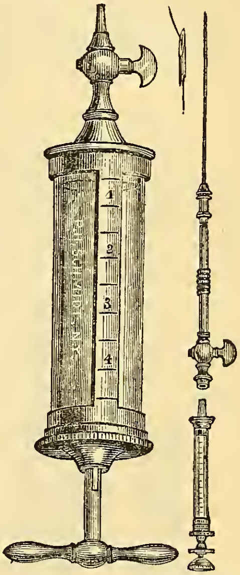


FIG. 97.—Aspirator-syringe, with long, slender needle and hypodermic syringe attachment. (P. F. M.)

In order to avoid the cumbersome apparatus of a Dieulafoy's aspirator, I have had a glass syringe made holding 4 ounces, the nozzle of which is provided with a stopcock. To this nozzle is attached a slender metal tube, 4 inches long, also with a stopcock, and to this tube the needle, each being separate. My method of procedure is usually the following: Having selected the spot where I think fluid is most likely to be found, I attach the slender tube with the needle (4 inches long) to my ordinary hypodermic syringe (to the tip of which the tube has been made to fit) and have now an aspirator 10 inches long (needle 4 inches, tube with stopcock 4 inches, syringe 2 inches), which I introduce on my finger into the vagina. The needle-point is guarded by a cork, which I slip off when the chosen spot at the vaginal roof is reached, and the needle is driven into the tumor. The stopcock is now opened, and the syringe-piston drawn back. If fluid follows, I close the stopcock, remove the hypodermic syringe, attach the large syringe and withdraw all the fluid. In this way air is prevented from entering the tumor, by closing the stopcock before detaching the hypodermic syringe; and I am enabled to follow the diagnostic aspiration by the immediate removal of the fluid, without reintroduction of the needle, if thought advisable. This apparatus is cheap, serviceable and convenient in all cases where, as is usually the case in these obscure pelvic abscesses and small cysts, the quantity of fluid to be removed does not exceed several ounces.

I have thus far met with no unpleasant reaction whatever after this procedure. The exclusion of air, the small size of the needle, and probably the hardened character of the tissues may account in part for this immunity. Other operators report precisely the same absence of reaction.

I have practised this diagnostic aspiration in the outdoor clinic and once (in a case of small cyst of the broad ligament) in my office ; but I should certainly advise it always to be done at the home of the patient. Indeed, this is usually indispensable, as such patients are generally little able to walk about. Hot applications to the hypogastrium and rest in bed for a day or two are useful prophylactics after the operation. In case of pain a hypodermic or suppository of morphine should be given.

EXAMINATION BY REFLECTED LIGHT.

Ordinary bright daylight answers every purpose for the inspection of the genital organs, both external and internal. But it frequently happens that the daylight is less bright than usual, or the window through which it shines is inconveniently situated in respect to the position of the patient, who for reasons of time or expediency cannot be shifted to a better location; or an examination or operation may have to be done by arti-

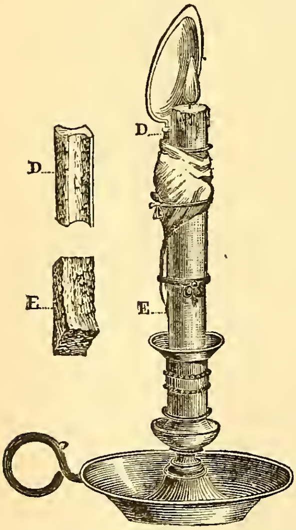


FIG. 98.

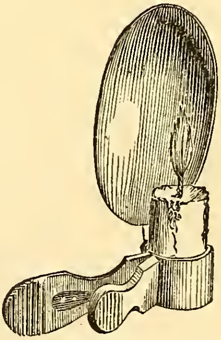


FIG. 99.

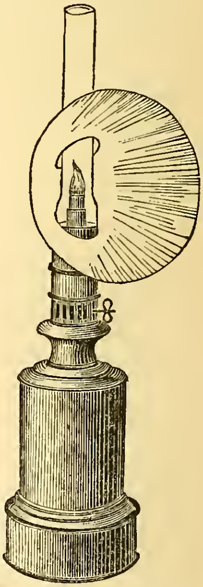


FIG. 100.

FIG. 98.—Improvised reflector: D, E, pieces of cork cut to fit the candle for the spoon-handle to rest against. (Leblond.)

FIGS. 99 and 100.—Reflectors for specular examination. (Leblond.)

ficial light. For the purpose of throwing the sunlight on a given spot, for instance into the recesses of the abdominal or pelvic cavity, a common concave hand or frontal mirror may be used. The same instrument also answers very well for the reflection of artificial light, and has the advantage over more powerful reflectors in being easily portable. In the absence of a mirror a very simple and fairly efficient reflector to a limited extent is rapidly constructed by fastening a bright pewter or silver tablespoon against a candle with the bowl on a level with the flame, as shown in Fig. 98. Or, a plain reflector of tin may be slipped over a German student's lamp, or more elaborate reflectors of glass or polished metal may be attached to extensible gas-pipes. I have found the reflector shown in Fig. 100 to answer every purpose of efficiency and economy.

By a clear, well-reflected light every examination and operation may be performed as well as by daylight. I once assisted at an operation for laceration of the cervix uteri by artificial reflected light, and was exceedingly pleased at the brightness of the field of operation. In judging of the exact color of the vagina and cervix, clear bright sunlight is preferable to yellow candle or gaslight.

Gynecological Case-Schedule.

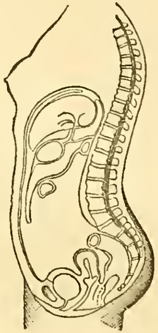
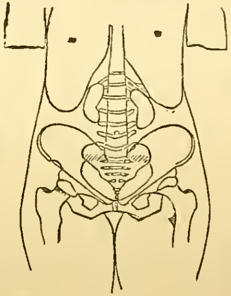
A systematic course of inquiry and examination, both oral and physical, is quite as important in taking the history and making the diagnosis of a case of utero-ovario-pelvic disease, as it is in any other branch of practical medicine. For this purpose a printed schedule is eminently useful, which when filled out, affords besides a full record of the case for future reference. The form printed on the next page is one which I have been using for several years and have found to answer the needs of a miscellaneous gynecological practice. For special operations, such as ovariotomy, laparo-hysterotomy, etc., separate schedules should be prepared; those of Spencer Wells, or H. Lenox Hodge are excellent. More elaborate schedules, giving a full page or more to each case, may be prepared; but I have found that in busy practice such large blanks are rarely filled out.

Three or four of such forms under one top-heading may be printed on one sheet of the Case-Book, and the book thus prepared will not exceed a convenient size for office use. The one I use measures eleven inches in breadth, and fifteen inches in length, and has three forms to the double page, under one general top-heading.

When the examination has been concluded, the physician should give his opinion of the patient's case in as few words as possible, avoiding all ambiguity, confusing medical phrases, and unnecessary explanations. Intelligent patients generally desire to know their exact condition, and it may, therefore, be proper and wise for the physician to gratify the patient's natural curiosity by showing her, by a diagram, what that condition is, if his judgment tells him that she is a proper person. I have a blackboard in my office for the purpose.

When asked as to the prognosis, the physician should neither exaggerate the severity of the case nor the urgency for treatment with the (to a certain degree justifiable) object of inducing the patient to take treatment which she greatly needs and might defer, if her case were not strongly put to her; neither should he undervalue the affection and the time which it may take to effect a cure or procure relief. In the former case the

DOUBLE PAGE.

No.	Date.	Name. Age. Address.	Married or Single.	No. of Children.	Date of last Delivery.	Previous Diseases.	Prominent Symptoms.	Physical Signs.	Diagnosis.	Treatment.	Progress.	Termination.
		Social Position. Occupation.	How long Married.	No. of Miscarriages.	Duration of Illness.	Health of Parents.						
							Menstruation. First appearance. Regularity. Duration. Amount and character. Pain, during, before, or after. Last appearance. Pain. In back. In legs. In abdomen. In head. In thorax. In intercourse. In sitting. Locomotion. In standing. In walking. Appetite. Digestion. Defecation. Regularity. Pain during. Urination. Vaginal Discharge. Amount. Character. Persistence. Duration.	Uterus. Position. Shape. Size. Length of cavity. Secretion. Mobility. Cervix. Shape. Length. External os. Internal os. Density. Douglas' pouch. Vaginal vault. Ovaries. Tubes. Broad ligaments. Vagina. Ext. genitals. Bladder. Rectum. Pelvis. Other organs.	 	General. Local.		

patient might consult another physician and tell him of the grave opinion given by the first gentleman, which the second finds unwarranted by the facts; and in the latter instance, if the case turns out more tedious and intractable than was expected, the patient holds the physician responsible for her disappointment, and blames him herself and to her friends accordingly. It is always advisable to acquaint the patient with the gravity of her case (without unnecessarily alarming her), and tell her whether a speedy or eventual cure may be expected, or whether her case is but little likely to be benefited. In intractable chronic affections, like areolar hyperplasia, chronic ovaritis, chronic pelvic peritonitis and cellulitis, it is always well to tell patients that much good can be done them and some improvement obtained by persistent local treatment for several months, but that a complete cure may perhaps never be achieved. Of course I do not advise that the few remaining months of a patient suffering from cancer should be embittered by being told of her hopeless condition as soon as it is discovered, unless she positively demands the truth, or family reasons require that she be undeceived in her hope of recovery. The relatives should, however, always be informed of the fact, and the futility of all but palliative remedies.

PART II.

MINOR GYNECOLOGICAL MANIPULATIONS AND APPLICATIONS.

I. Catheterization.

The indications for removing the urine of a woman by artificial means need hardly be specified, since they are usually comprised in the one fact—the inability of the woman to empty her bladder herself. There are, however, four other conditions in which it may be desirable to remove the urine by the catheter, viz.: 1, when the patient is unable to pass urine in the ordinary erect position, and it is important to prevent the urine from touching the external genitals, as would be the case if she passed it in the dorsal supine position (after the operation for laceration of the perineum); 2, when the bladder is to be preserved from distention, as after the operation for vesico-vaginal fistula, when a permanent catheter is usually introduced until the wound is healed; 3, when it is intended to secure a specimen of urine entirely free from utero-vagino-vulval or lochial discharge, as for microscopic examination; 4, when the woman is under an anesthetic. The mere fact that the patient claims not to be able to pass urine does not prove that the bladder is distended; she may have passed it unknowingly while at stool, or the kidneys may not be doing their duty, or the skin and other emunctories may have temporarily supplied their place. Neither does the statement of patient or nurse, that the urine has been regularly passed, positively demonstrate the emptiness of the bladder. It not unfrequently happens after confinement or operation that the nurse or patient, or both, make this assertion, and the physician, seeking the cause of the feverish condition of his patient, finds the bladder distended nearly to the umbilicus, with the urine dripping away, like the overflow from a tank, and removes with the catheter pints of foul, decomposed urine. There was temporary retention from compression and edema or spasm at the neck of the bladder, or the elongated urethra (during pregnancy) became flexed on the descent of the uterus after delivery, and the flow of urine was thus obstructed (Olshausen's explanation of the frequent temporary retention of urine immediately after delivery); the detrusor vesicæ then became paralyzed, unaided as it was by pressure from the now flabby abdominal muscles, and the bladder continued to enlarge until the sphincter-like fibres at the neck of the bladder yielded, and allowed the escape of a few drops. Such a condition as this cannot miss detection if the proper external examination is made. In no case, therefore, in which there is any suspicion of trouble in the function of micturition should a careful physical examination of the vesical region by palpation and percussion be omitted.

No person acquainted with the anatomy of the parts, need be told how to introduce a catheter into the female bladder when the meatus urinarius is exposed to sight; gentleness and caution in the introduction and removal are the only directions to be given. But to find the meatus and introduce the catheter by the touch alone, is quite another and more difficult matter, requiring a touch practised in detecting the location of the opening. This knowledge is obtained only by frequent education of the tip of the index finger in the peculiar sensation imparted by the small circular ring of the meatus. The acquisition of this faculty is by no means unimportant, for it enables us to avoid the always disagreeable exposure of the person, and may at times be indispensable when edema of the labia interferes with inspection of the vestibule, or the presence of sutures in the perineum renders a separation of the labia, for the purpose of exposing the meatus, unadvisable. The rule holds good in this maneuvre as in every other performed on the female genital organs, that while a *necessary* exposure should never be omitted for mere reasons of prudery, such exposure should not be inflicted when the examination or manipulation can be as well performed under the clothes. The practitioner should, therefore, accustom himself to the touch of the female urinary meatus in order that he may recognize it when he is called upon to empty a patient's bladder.

Standing somewhat to the side of the patient, who lies with thighs separated (not necessarily also elevated), the index finger of either hand is slipped from the perineum into the vagina, and then out again over the concave border of the symphysis of the pubic arch (where it glides along the bulbous projection of the urethra) on the vestibule, where it searches for a small depression barely large enough to admit the very tip of the finger. This small circular opening is situated about one-third of the distance up the vestibule, the urethra curving slightly upward; it is recognized by the comparatively sharp ring formed by the edge of the meatus when it is distended by the finger-tip. It is the detection of this small ring by the touch which constitutes the only difficulty in the maneuvre. The finger having found the meatus, presses gently against it, with the volar surface upward; the catheter (metal or elastic; if the latter with or without mandrin), is seized in the three fingers of the other hand (the index closing the mouth) and passed on the index finger into the meatus, precisely as the sound is passed into the uterus. When the tip of the catheter is felt to enter the urethra the other end is depressed, and the instrument gently pushed forward until the cessation of even slight resistance shows that it has entered the bladder. The finger is now removed from the mouth of the catheter, and the urine allowed to escape into the vessel held ready for it. I prefer a cup or bowl for this purpose, which can be placed between the thighs and does not occupy as much space as a chamber vessel. When the urine ceases to flow, gentle pressure may be made over the pubis, or the catheter pushed in a little deeper or withdrawn a short distance in order to catch whatever urine may have been retained in diverticles of the bladder. When the last drop has escaped, the catheter is again seized between the three fingers with the index on the mouth in order to prevent the few drops of urine in the catheter from soiling the clothes, and gently withdrawn; when the point is held over the vessel the finger is removed from the mouth and a few drops always escape from the other end. The introduction of the catheter into the normal urethra is usually painless, with the exception of a slight disagreeable sensation as it passes into the bladder. Its withdrawal often gives somewhat more pain when the circular muscular fibres at the neck of the bladder contract on it and oppose its removal; cessation of traction for a few moments and then gentle, steady traction will usually overcome the obstacle. In irritable, inflamed, or fissured urethræ, the catheter gives more, even decided pain; so also in cystitis when its point strikes the wall of the bladder. If the urine ceases to flow when percussion shows that the bladder is not empty, in all probability the eye of the catheter is choked up by vesical mucus, which can be removed by passing the mandrin into the catheter.

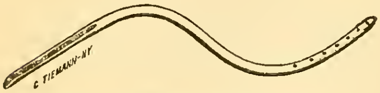


Fig. 101.—Sims' sigmoid catheter.

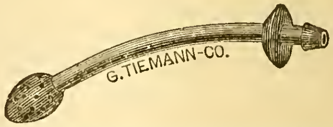


Fig. 102.—Goodman-Skene's self-retaining catheter.

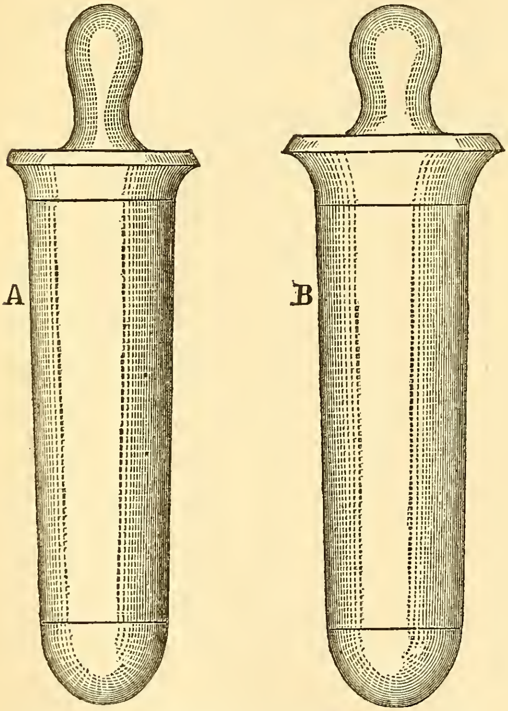


Fig. 103.—Simon's set of urethral dilators (natural size).

In some women the vestibule of the vagina presents several little shallow depressions (congenital formations, usually associated with redundancy of the anterior border of the hymen or its remains) which may confuse the practitioner in his search for the meatus, the only opening or irregularity in the normal vestibule. The sharp ring already spoken of, will prove the distinguishing mark. At times the meatus is situated exactly on the edge of the anterior border of the vaginal orifice, and is pushed slightly within the orifice by the finger, thus escaping from the tip of the catheter and materially increasing the difficulty of its introduction. A loose attachment of the urethra to the symphysis pubis is probably the reason of this displaceability of the meatus.

Cases suffering from a purulent or infectious discharge from the vagina form an exception to the rule of not exposing the patient for any manipulation practicable under the clothes. By means of the finger the infectious substance may be carried to the meatus and thence into the bladder by the catheter, and an acute cystitis be the result. For this reason it is usually advisable to introduce the catheter in lying-in women by sight rather than by touch; for Olshausen, who has investigated this subject, has shown that acute cystitis is not unfrequently produced by the introduction of lochial fluid into the bladder on the catheter. A careful cleansing of the external genitals, and the exposure of the meatus during the catheterization is advisable. The same rule applies for the same reason after a perineum operation; and also if the practitioner is not very skilful in finding the meatus, but endangers the union of the rent, in his endeavors to touch that opening.

After the operation for vesico-vaginal fistula, it is customary to introduce a self-retaining catheter until the stitches have been removed; this is also frequently done after the secondary operation for lacerated perineum, to prevent the urine from touching the wound, and relieve patient and physician from the annoyance of frequent catheterization. Sims' sigmoid catheter (Fig. 101) is, undoubtedly, the best instrument of the kind, better than the elastic rubber catheters which are liable to slip out, and rapidly become foul. The sigmoid catheter requires to be removed and cleansed every day. It is retained by its peculiar shape, balancing, as it were, in the urethra. A vessel between the thighs of the patient receives the constantly dropping urine. All patients do not bear these self-retaining catheters well, and complaints of vesical pain and tenesmus occasionally require the removal of the instrument and a return to frequent catheterization or spontaneous urination. It is by no means absolutely necessary that the urine should constantly escape after fistula operations (Simon allowed his patients to urinate normally at frequent intervals, and other operators use the ordinary catheter), or that it should be kept from the surface of a freshly united perineum. I have frequently seen perfect union ensue both after the primary and secondary operation, in cases where the patients urinated at will, and the external genitals were merely washed by a gentle stream of tepid water immediately after each evacuation of the bladder.

A very serviceable instrument is the self-retaining catheter of Goodman, modified by Skene (Fig. 102). It is chiefly used in cases of chronic cystitis, when it is desired to maintain a continuous drain of urine from the bladder. A rubber tube attached to the mouth of the catheter leads the urine into a vessel at the bedside, or a rubber receptacle worn under the clothing. This instrument may be worn for months, while the woman is about her daily avocation.

II. Dilatation of the Urethra.

Although really one of the minor operations of gynecology, the dilatation of the female urethra is discussed in this connection for convenience's sake.

The *indications* for the operation are either of a diagnostic nature (as already referred to), or for therapeutical purposes. For diagnosis, the dilatation is performed to permit the introduction of the finger or endoscope; for therapeutical purposes, as a means of cure, through distention of the canal alone, and to permit the free introduction and exit of instruments and fluids. Thus, in cases of irritable urethra or bladder, or fissure of the urethra, or after removal of urethral caruncle, or in chronic cystitis, the hyperdistention of the urethral walls affords a very efficient, perhaps certain mode of relief; further, in vesical calculus, dilatation permits the removal of the entire or crushed stone, and in chronic cystitis the free efflux of injected fluid. In the latter condition, besides, the free drain, which may follow thorough dilatation of the urethra for several days, gives at least temporary relief.

For tenesmus and irritable urethra and bladder, a distention to the largest size of Peaslee's dilators will usually suffice, and will occasion comparatively little pain. For the other conditions, the urethra should be dilated to the free admission of the index finger, an operation always calling for an anesthetic.

When the urethra has been dilated to its full dimensions, the diseased (inflamed or ulcerated) spots may be exposed with the speculum or endoscope (as already described under Examination of the Bladder), and medicinal agents be directly applied to them through the tube.

The digital exploration of the vesical mouths of the ureters, and the practicability and utility of sounding these ducts has already been referred to under Digital Examination.

Operation.—The dilatation of the urethra may be performed either by the finger or by instruments. As a rule, every dilatation must be begun by instruments until the tip of the little finger can be introduced: thus, the ordinary dressing-forceps, or Peaslee's or Hanks' or Simon's dilators (see Fig. 103) are introduced, and the urethra gently stretched to the width of the little finger. Although in apathetic subjects the dilatation may be performed without an anesthetic, it is generally advisable to put the patient at least into the first temporary unconsciousness attending every anesthesia, if the dilatation is to be pushed farther than the width of the little finger.

The patient being anesthetized, and occupying the supine position on the back, the forceps or dilators are gently introduced through the urethra into the bladder and gradual dilatation performed, until the urethra seems sufficiently large to admit the tip of the little finger. Some blood may escape during this process, but usually no visible laceration of the meatus is produced. The tip of the little finger is then engaged in the meatus, and gently pressed forward by a half-pushing, half-boring motion until the constriction at the meatus is passed, often suddenly (with more or less nicking of the border) and the finger passes the slight obstruction at the neck of the bladder, and its tip enters that viscus. Some difficulty is occasionally produced by the flexibility of the little finger and its metacarpal joint, and the loose attachment of the urethra to the pubic arch; in such cases, more force, usually of a pushing nature, is required, or the urethra must be supported by the other hand, or the index finger takes the place of the little finger as a dilator. If it is desired to push the dilatation still farther, the little finger is withdrawn, and the index gently forced into the bladder in the same manner, with, of course, more or less laceration of the meatus (generally upward toward the clitoris) proportionate to the dilatability of the canal, the friability of the tissues, and the size of the finger. I have seen quite severe hemorrhage follow this supreme dilatation, which was always speedily arrested by packing the vulvar cleft with cotton wool and a tight T-bandage. The index is introduced nearly its whole length, and its third joint and one-half of the second then project into the bladder, sufficient for palpation of that organ and its surroundings.

If still greater dilatation is desired, a virgin cylindrical speculum may be introduced (as I have done) or a bi- or tri-valve rectal speculum employed. But it should be remembered that greater dilatation than the size of the index finger is more than liable to be followed by permanent incontinence. Occasionally, in large stones or in tumors in the bladder, it is necessary to open the urethral canal still more, and it may then be split toward the vagina with knife or scissors to greater or lesser length, only to be immediately united by suture after the removal of the growth. The points of constriction of the finger are at the neck of the bladder and the meatus; chiefly, I have found, at the latter.

This operation has but recently been developed into a systematic procedure by the late Prof. Gustav Simon, of Heidelberg, who gave explicit directions for its performance and demonstrated its perfect innocuousness (in his hands, at least). His method consists in nicking the upper border of the meatus with the scissors on each side to the depth of $\frac{1}{4}$ ctm., and the lower border once to the depth of $\frac{1}{2}$ ctm. He then introduces his set of hard rubber specula, guided by a mandrin with a round button, one after the other, until the largest one has been used. The set consists of seven specula, varying between $\frac{3}{4}$ ctm. and 2 ctm. The largest is followed by the index finger, the corresponding middle finger being introduced into the vagina (whereby the index is enabled to penetrate about 1 ctm. deeper), and the other hand crowding down the bladder. This dilatation is feasible without the least force in from five to seven minutes. Laceration of the urethra or vestibule is rare, whereas Heath reports to have torn the urethral mucous membrane under the pubic arch in every case of unaided digital dilatation. Simon denies the occurrence of incontinence after this, and even larger, dilatation. Indeed, he claims, that in the adult female the urethra may be dilated to the circumference of 6.5 to 7 ctm., and in girls to a circumference of 4.7 to 6.3 ctm., without incontinence. Winckel corroborates Simon's statements as to ease and innocuousness of the dilatation in the above manner, but says that in all his seven cases the incisions were torn deeper, or another tear occurred at the meatus; the pressure of the speculum arrested all hemorrhage. After the largest dilatation a forceps could be passed into the bladder at the side of the index, which he found impossible after simple digital distention.

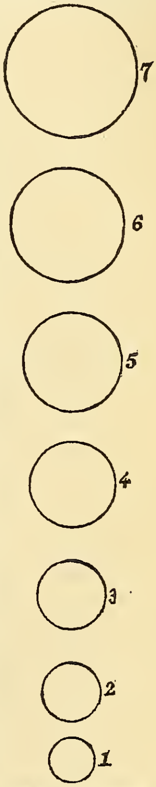


Fig. 104.—Scale of dilatation of Simon's dilators.

Since the patient is generally anesthetized, the rule is to perform this operation at her home or in the hospital. But I have several times undertaken it in a minor degree, with excellent results, in the out-door clinic and at my office, with and without chloroform.

Dangers.—The chief danger resulting from dilatation of the female urethra is the possibility of permanent incontinence. But this will never be observed after the minor degree of dilatation for the little finger, and but rarely after that for the index.

The high figures of Silbermann, who collected forty-eight cases of rapid dilatation with eight instances of permanent incontinence, can scarcely be considered a fair showing, since Simon's and Winckel's results are entirely different. Winckel correctly observes that the operation in these cases must have been performed with improper instruments, and in a brusque manner, not slowly and gradually with Simon's specula, and the bad consequences therefore should not be attributed to the method, but to its improper execution. Of recent writers, Emmet is particularly emphatic in warning against this hyper-dilatation, of which he claims he has seen two proofs out of eleven cases in the gaping incontinent urethræ of women who came to him to the Woman's Hospital for relief—a relief which, unfortunately, is not easy to give, as the tone of the flabby canal is not restorable, and the operation for its constriction is a difficult one. In contradiction to this warning voice is the experience of Noeggerath, who has seen but two cases of incontinence out of seventy-five dilatations; and I myself have, in some twenty instances, seen not even temporary incontinence. In one case of hyper-distention with index in bladder in a young girl, urine was passed normally within four hours. But, in view of the difficulty of relieving permanent incontinence, Emmet's caution should certainly be respected, not to practice the dilatation unnecessarily, rudely, or too thoroughly. Whether Emmet's dictum, that the advantage gained does not compensate for the risk, is always correct, remains to be seen. Certainly the *very* small number of cases of permanent incontinence reported cannot as yet be considered as condemning the practice. Another danger possibly following dilatation is the production of peritonitis. Of this, so far as I know, only one case has been reported (by Etheridge, of Chicago), in a girl in whom peritonitis and fatal typhoid followed a urethral dilatation. The danger of hemorrhage from the lacerations produced need scarcely be mentioned, unless the tear should extend so deeply into the vestibule toward the clitoris as to wound the large plexus of veins and arteries there situated, in which case the hemorrhage might be profuse and require to be arrested by deep sutures and compression.

The recurrence of a chronic pelvic perimetritis or peritonitis after dilatation is certainly possible; therefore, such conditions, if the least tenderness on pressure or decided pain exists, would counter-indicate the operation.

Other reaction than some burning in the urethra and vulva, chiefly on micturition, is not usually noticed. The occurrence of vesical catarrh, and of urethritis mentioned by Noeggerath and Winckel I have not observed. Recognizing the possibility of such an occurrence, I have generally advised the application of cold water compresses to the vulva for twenty-four hours after the dilatation. Winckel says that the occurrence of cystitis after dilatation cannot be denied, but that irrigation of the bladder will relieve it in a few days, and that the advantages derived from this method of examination by far exceed its dangers.

The *counter-indications* to dilatation are such conditions as would be likely to produce permanent incontinence, hemorrhage, or inflammation, viz.: great friability or brittleness of the tissues, varicosity or edema of the vestibule, and acute or subacute pelvic or peritoneal inflammation.

III. Injections into the Bladder.

Under this title are included not only the injection into the bladder of medicinal solutions, but also the irrigation or washing out of the viscus for purposes of cleanliness or disinfection.

The *Indications* for the introduction of fluid, into the bladder are, therefore, twofold: 1, the washing out of its cavity, the removal of decomposing urine and mucus, of purulent secretions, or inorganic deposits from the urine; and 2, the injection of medicated fluids for the cure of certain pathological conditions. The special indications for the practice are almost invariably the presence of chronic cystitis with its concomitant erosion or ulceration of the mucous lining. As a therapeutic agent the simple irrigation of the bladder with tepid water, generally containing chloride of sodium one drachm to the pint, frequently repeated, will often suffice to cure even obstinate cases of cystitis.

When a patient complains of the well-known symptoms of cystitis (frequent micturition always accompanied by vesical tenesmus and scalding, cloudy or purulent urine), and these symptoms have existed for some time, weeks or months, internal remedies will generally have been found ineffectual, and the final resort to local treatment becomes imperative. The bladder is, then, usually first washed out with the tepid salt solution and, if thought necessary, its interior examined by the endoscope through the dilated urethra, and direct application made to any ulcerated spots which may be discovered. In the large majority of cases of chronic cystitis local treatment will be found indispensable to the cure, or even alleviation of the disease.

Method.—It may seem exceedingly simple to inject fluids into the bladder, when the injection tube has once been introduced, and so it is. But there are various precautions to be observed as to the kind of tube, force and quantity of injection, which are by no means unimportant, both with regard to the feelings of the patient and the success of the treatment.

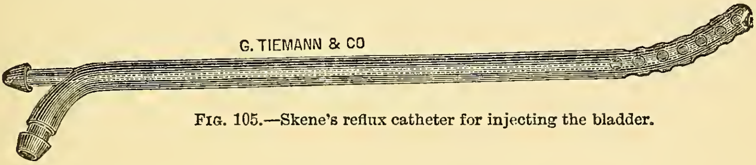


FIG. 105.—Skene's reflux catheter for injecting the bladder.

An injection may be made through the ordinary metal or hard rubber or the elastic catheter. But the large size of the eyes of the ordinary catheter permits folds of the mucous membrane of the bladder to be sucked into them when the fluid is withdrawn, and superficial injury easily results therefrom. A much preferable injection tube is one with numerous small perforations within an inch or more of the blunt tip. The best instrument is one with a double tube to enable the constant egress of the fluid while the injection is going on. The double catheter of Dr. Skene possesses every requisite, the fluid entering through the slender central tube and escaping through the larger shell; rubber hose is attached to each nozzle. The best means of propelling the fluid is by hydrostatic pressure; therefore, a fountain-syringe or irrigator is the instrument to be preferred. The injection should be steady and uniform, not in sudden jerks. A stopcock in the catheter is very convenient to regulate the amount and rapidity of the injection and escape of the fluid. A hard rubber catheter is preferable to a metal one, as it is not affected by acids. The sudden injection of the fluid causes intense pain by subjecting the bladder to a rapid distention to which it is not accustomed; and the quick evacuation of the fluid causes the bladder to contract so rapidly as to wound itself against the end of the catheter. The regulation of the flow by the stopcocks prevents either of these occurrences.

The necessity of avoiding all force in injecting the bladder has already been pointed out. The fluid should be allowed to flow in by its own weight. The quantity to be introduced at each sitting varies greatly with the capability (not capacity) of the bladder, and that quality depends on the duration and severity of the disease, and the consequent irritability of the organ. In some cases, I have allowed a quart of water to flow gently into the bladder before pain or desire to micturate was complained of; in others, but a pint was tolerated, and in others again but a few ounces. If the double current catheter is used the water can generally be allowed to flow *through* the bladder until it is perfectly cleansed, without giving appreciable pain. Winckel proportions the amount to be injected to the age of the patient and the size of the bladder, $\frac{1}{4}$—$\frac{1}{2}$—1 litre, several times daily. Skene lays down the following rules: 1. Inject only one ounce at a time, repeating this, if necessary, three or four times at the same sitting. 2. Inject as slowly as possible, avoiding all sudden jerking. How the bladder can be thoroughly washed out by injecting only an ounce of fluid each time I cannot understand, unless many more separate ounces be injected than Skene permits; nor can I see the necessity for such excessive precaution as to quantity so long as a double catheter is used. These cleansing injections or irrigations of the bladder should always immediately precede the injection of a more or less highly medicated fluid. In themselves the cleansing injections are an exceedingly valuable therapeutical agent in chronic cystitis. They may be continued once or several times daily for weeks, and finally effect a cure. Pure water, however, should not be used, as it has been found irritating to the bladder. The addition of chloride of sodium one drachm, or chlorate of potash one-half drachm, to the pint makes the best cleansing fluid; if there be ulceration or suppuration, a strained decoction of flaxseed or lime-water, or better still, a one per cent. solution of carbolic acid or one-tenth per cent. solution of salicylic acid may be used. If the urine is alkaline or offensive, two minims of nitro-muriatic acid should be added to the ounce of water; if it is acid, as many grains of bicarbonate of soda to the ounce. By injecting solutions of chloride of sodium (4:1,000, increasing daily by 15 grains) three times daily for twenty-five minutes each time, Lemaistre-Florian claims to have cured chronic cystitis in twenty-one days. The temperature of the water should always be from 90° to 100° F. If these cleansing injections, one or all, do not relieve the case, positively astringent or caustic applications should be made. The two great precautions to be observed in using these therapeutic injections are to inject only a small quantity at a time, from five drops to one ounce, and never to use solutions strong enough to give actual pain. Winckel follows the irrigation with salicylic solution (if necessary) by injecting a solution of nitrate of silver of the strength of 1—2—3 parts in 500, or of tannin gr. v. to xv. to ℥ iv., continuing this for weeks. Braxton Hicks uses for acute cystitis an irrigation of one litre of acidulated water (nitro-muriatic acid 2 drops to 1 ounce) and then injects a solution of morphine 1—2 grains to the ounce, causing this to be retained as long as possible for purpose of absorption. When the acute symptoms have subsided, solutions of tannin, or 3 to 4 drops of the tincture of the chloride of iron to 1 ounce are injected. Skene recommends, for pain, injections of chloral hydrate, 10 to 15 grains to one ounce of water. As astringent and alterative injections Skene speaks of the silver nitrate, sulphate of zinc, tannic acid and acetate of lead, 1—2 grains to the ounce, increasing the strength, if necessary, but not sufficient to give pain. Infusion of hydrastis canadensis is also useful. In obstinate cases, Skene speaks highly of a strong solution of nitrate of silver, 20 grains to the ounce, injecting only 5 to 10 drops at a time. To insure the injection of no greater quantity an instillation tube of glass, with small rubber bulb attached, is used by Skene, or a No. 1 or 2 elastic catheter with a hypodermic syringe attached may be used, this small catheter being introduced through the larger one which has first been used to wash out the bladder; when 5 to 10 drops have been injected, the small catheter is removed and a little water injected through the larger tube, which dilutes the caustic and prevents too deep action. The injection of normal urine in cystitis is deprecated by Skene. Iodoform (by insufflation, I presume) has also been recommended. If the urethra is so tender as to render the introduction of the catheter difficult, without anesthesia, Hicks and Skene recommend to force the injection from a larger syringe into the urethra and bladder by inserting the point of the syringe only part way into the urethra or simply holding it against the meatus; the stream is then forced into the bladder, and the necessity for anesthesia may be avoided.

IV. Application of Medicinal Agents to the Vagina and Cervix.

Medicinal agents may be applied to the mucous membrane of the vagina, intra-vaginal portion of the cervix and external os uteri, by various methods, as in *solution*, by vaginal injections, through specula, and on wads of cotton; as *powders*, through specula, on cotton and by insufflation; as *ointments*, through specula, and by a syringe; in *suppositories*, and capsules through tubes.

a. *Vaginal Injections.*

The application of water, pure or medicated, to the walls of the vagina, and cervical portion of the uterus, in health and disease, by means of syringes of various patterns, has been in use since time immemorial. The ease with which such applications are made has rendered them popular far beyond the deserts which the merely temporary contact of the injection fluid with the vaginal walls entitles them to. It is only within recent years that the true value of many of these injections has been recognized to consist in their thermic qualities. The necessity for using this method of local medication, in one form or the other, in the majority of gynecological cases, calls for a detailed description of the instruments employed, the constitution of the fluid, the indications and utility, counter-indications, and dangers of vaginal injections.

Vaginal Injection Apparatuses, and their Use.

The number of contrivances for the introduction of fluids into the vagina is very great, too great, indeed, for description, even if they were all practically useful and safe. I shall mention only the few which have stood the test of experience, and which answer every purpose of utility, convenience, and economy.

The old, time-honored, metal piston-syringe of the Europeans is, happily, a thing of the past, with us, at least, and is mentioned only to be condemned.

The apparatuses differ in construction in one essential particular, viz., in the propulsive agent by which the fluid is forced from the syringe, it being in the one variety the muscular force of the patient herself, or an attendant; in the other variety, simple hydraulic pressure; in the third, suction. Of the instruments operated by the muscular force of the patient or attendant, only one need be mentioned, the familiar Davidson's syringe, which is in possession of every woman in the land. If proper care is taken of it, especially if it be not kept in too dry a place, it will be found very durable. Like all rubber, however, it is liable to crack after a time, and if this accident happens to the bulb, the syringe becomes useless and irreparable. If only one of the valves shrinks, it may be replaced by a new one at the instrument-maker's or druggist's; and if the rubber tube wears through at the junction with bulb or attachments, as it often does, the cracked portion may be cut off and the tube fastened again by tightly wound cord, when the syringe will act as well as ever. An objection to the instrument, as still sold, is the presence of a central aperture in the vaginal nozzle, to the danger of which I shall refer more at length later on.

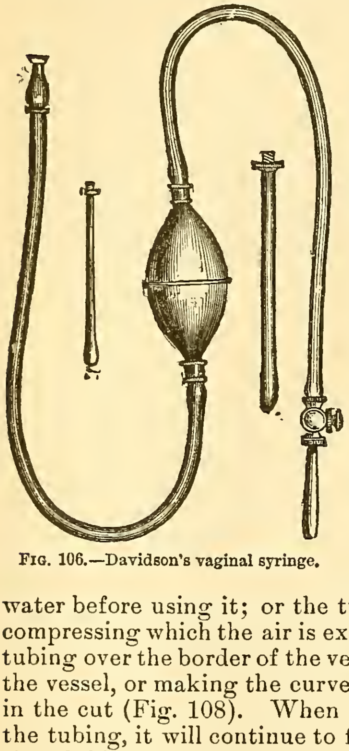
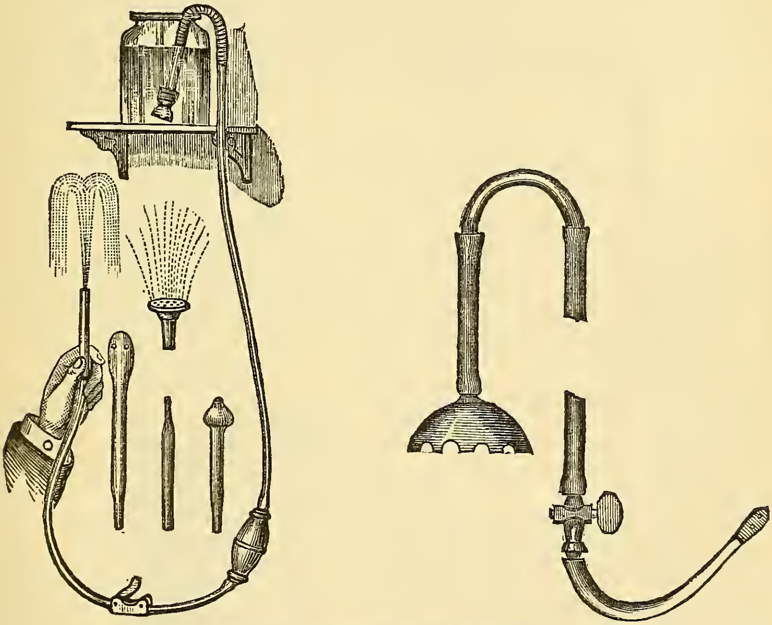


FIG. 106.—Davidson's vaginal syringe.

The one great objection to the Davidson, no matter how excellently constructed, is that the force required to use it for any period of time exhausts the patient, or necessitates the aid of an attendant. To obviate this, a syphon arrangement has been introduced, the credit of which has been given to Scanzoni. The diagram shows its construction and working. An unpleasant feature of this contrivance is that the air has to be sucked out of, and the water into, the tube by applying the mouth to the vaginal end; this may be avoided by allowing the water to run by gravitation into the tube, or laying bell, tube, and all, with open stopcock, into the water before using it; or the tube may be supplied with a rubber bulb, by compressing which the air is expelled (Fig. 109). The flexion of the rubber tubing over the border of the vessel may be obviated by attaching a spout to the vessel, or making the curve of the tube of inflexible material, as shown in the cut (Fig. 108). When the stream has once been directed through the tubing, it will continue to flow until the vessel is empty. I have mentioned this contrivance because it really is practical, and may prove serviceable in emergencies. But I can hardly conceive of an occasion when the much more convenient apparatus, now to be described, cannot be obtained or constructed with the same materials needed for the siphon. The ordinary surgical irrigator is certainly the perfection of a vaginal syringe, and combines convenience, efficiency, and safety. It may be made as economical as possible by using a plain tin pail, with ordinary rubber tubing and glass nozzle, or it may be elegantly painted and decorated, and be furnished with an unusually long tube, stopcock, and hard-rubber nozzle. I have had them made by Mr. Philip H. Schmidt, instrument-maker, of No. 1311 Broadway, for a number of years, with pails of different sizes, holding from one to eight quarts, at prices varying between $1.50 and $4.50, according to size, length of tubing, and quality of hard rubber work. For dispensary practice, he has even been able to furnish them for $1.25. All these pails are neatly painted and japanned. The nozzle of the cheap kind is glass, those of the better varieties of hard-rubber, as well as the stopcock. The nozzle has no central aperture. The tubing is attached to the side of the pail near the bottom, and not to the latter, so that the pail can both be stood on an elevation, or suspended by a hole near its upper border. In recommending a syringe for therapeutical vaginal injections, I have for several years given this irrigator decided preference. Its only objection is its importability; for cases, therefore, where the patient is likely to need the instrument while travelling, I recommend the very compact and portable fountain syringe, which consists of a rubber bag, holding from one to four quarts (according to number of syringe), with the various attachments of hard rubber and glass for vaginal, rectal, aural, nasal, ophthalmic, and other douches (Fig. 111). Some of these rubber bags are so contrived as to permit of their apertures being securely closed, when the bag can be used as a hot or cold water, or ice bag, at times a great convenience.



Figs. 107, 108.—Syphon vaginal syringe.

With these few simple apparatuses my list of vaginal syringes closes. The complicated and expensive instruments, with elegant Greek names, of Braun, Eguisier, Beigel, Woodward, etc., all act more or less by manual force, and have no advantage whatever over the Davidson; they are therefore not worthy of recommendation or description.

Method of using vaginal injections.—It is scarcely necessary to describe the manner of using the ordinary vaginal injections practised daily, or as often as the individual peculiarities of each case may require, by every woman who has any regard for her personal cleanliness. It is for this purpose that the Davidson syringe occupies so prominent a place in every household, unless its place be supplied by a hose and perforated tube attached to the water-closet or the bath-tub faucets; or a real French *bidet* with ascending vaginal tube, and single or double water compartment is used. The latter contrivance is certainly very convenient, since its height enables the lady to sit carefully on it as she would on a chair, and the fatiguing crouching on the ordinary chamber-vessel, and attending crowding down of the uterus, is thereby avoided. The vaginal tube of the bidet may be connected with the wash-bowl faucets, by a double tube, so as to allow the water from the hot and cold faucets to mingle and be regulated at will.

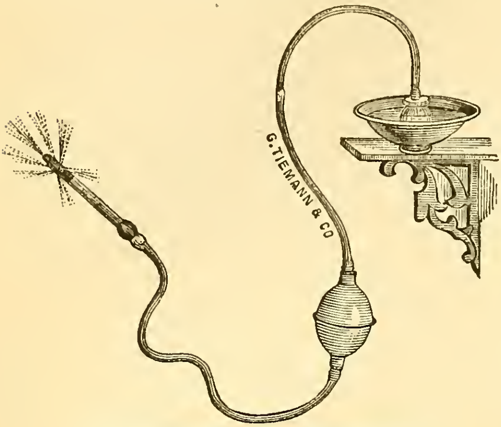


Fig. 109.—Syphon vaginal syringe with bulb.

For ordinary cleansing purposes, the erect, sitting or crouching position is admissible, if not advisable. But for the administration of *therapeutic* vaginal injections the *dorsal recumbent position with elevated hips* is the only one to be recommended or allowed. Whatever the injections may be used for, whether as astringents, hemostatics or absorbents, they can only exert their full benefit when the patient is lying down. In the erect or crouching position (especially the latter), the abdominal and pelvic viscera are naturally crowded down, the vagina is shortened, and the cervix uteri forced toward the vaginal orifice. Obviously the injection fluid will then fail to reach every portion of the rugous and collapsed vagina, the lips of the external os will be separated, and the fluid given free admission to the uterine cavity, and any displacement of the uterus and ovaries, and accompanying hyperemia (for the reduction of which latter the injections may have been ordered) will be increased. Besides, the immediate escape of the fluid to a great extent invalidates the benefit to be expected from a longer contact between it and the vaginal surface.

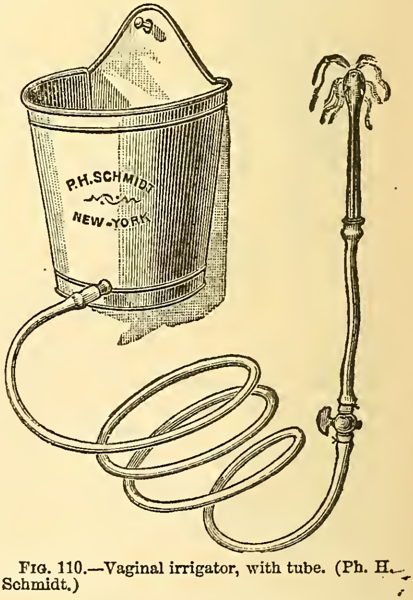


Fig. 110.—Vaginal irrigator, with tube. (Ph. H. Schmidt.)

Therefore, whether the apparatus used be the Davidson syringe, with its interrupted current, or the steady stream from the irrigator, the patient should occupy the recumbent position on her back, with elevated hips; in this position the abdominal viscera gravitate toward the diaphragm, the abnormally stretched uterine ligaments become relaxed, and the vagina is readily distended by the injected fluid, a portion of which will remain in the vaginal pouch, and in contact with the cervix until the patient resumes the erect position. The imperative necessity for the adoption of this dorsal position during all species of vaginal injections has not been clearly recognized and sufficiently insisted upon until quite recently, and it is chiefly to Emmet that the credit is due for its popularization, so far as the systematic injection of *hot* water is concerned. Really popular, it is safe to say, the position has not become even yet; and I am confident of not overstating the fact when I say that the large majority of general practitioners are still in the habit of recommending vaginal injections, medicated or not, without the slightest direction either to the manner or position in which they should be used, or the quantity to be injected. The almost uniform result is that the patient hastens over the disagreeable treatment as much as possible, and uses the injection in the habitual crouching or erect position, taking as little fluid, and cutting the whole process as short as possible, and consequently deriving but little benefit. Physicians should therefore be careful to impress upon their patients not only the exact proportions and the quantity of the solution to be injected, but also the temperature of the fluid, the force and duration of each injection, the manner of introducing the tube, the position to be occupied during the process, and the length of time this treatment is to be continued. Attention to all these details will ensure the best results, and the avoidance of accidents and disappointment.

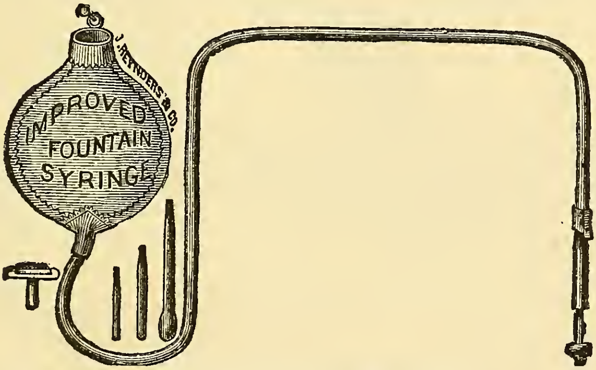


Fig. 111.—Rubber fountain syringe, with tubes.

The disadvantage of this recumbent position during vaginal irrigation is the difficulty of combining comfort and a proper receptacle for the injection fluid as it leaves the vagina. If the Davidson syringe with its short tubes is used, another difficulty is added, viz., the placing of the vessel holding the injection fluid conveniently to the vulva and hand of the patient. This difficulty may be obviated by the assistance of an attendant, but it is not always convenient or possible to secure such a one. Besides, in both systems of syringes, the injection of a large quantity of fluid requires the emptying of the receptacle once or oftener, a duty also devolving on an attendant. But this place of an attendant can be supplied by any one, even by a young girl, and there will rarely be a family in which such assistance cannot be obtained, if necessary. If a large-sized irrigator, and a chamber-vessel or large bedpan be used, or one of the devices now to be described is employed, the services of an attendant can usually be dispensed with, the patient herself emptying the receptacle when the injection is completed.

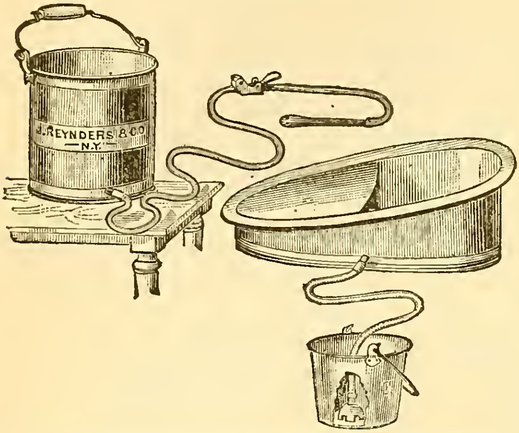


Fig. 112.—Merriam's vaginal irrigator, with bedpan and receiving-tub.

To overcome this difficulty various plans have been suggested and contrivances devised. I have found an ordinary large chamber-vessel placed under the nates of the patient, her back and head being properly supported by pillows, to answer admirably. Of course, a little ingenuity is required to place the vessel so that it does not sink obliquely into the mattress, and allow the water to escape on one side; and also to place the pillows comfortably. A shovel bedpan, as a rule, does not answer well, because its bevelled edge is liable to sink into the mattress, and its capacity is too small. The old-fashioned round bedpans are greatly preferable in this respect. Dr Emmet has the round bedpans made of copper, with a small outlet pipe over which a rubber tube is slipped to conduct the water from the pan. If the bed or couch is very soft, a board or hard cushion should be placed under the receptacle on which the patient lies. A round rubber air-cushion, fully inflated, with closed central hollow, will do very well, the water being caught in the large central opening; if an escape tube at the side is attached, as I have seen them, every requisite is supplied. A very simple and efficient substitute for a receptacle is furnished by a large rubber cloth properly arranged; this is hung over the edge of the bed, the patient placed on it with her hips close to the edge, and each foot on a chair close to the bed; the mattress at the edge is pressed downward, and a crease leading over the edge made in the rubber sheet; down this, water escaping from the vagina flows into a bucket on the floor. Of course, again, care must be taken not to let other creases run up on the bed, and the vulva must be at the very extreme edge of the bed, or else accidents will happen, and patients will be disgusted with the method when they have only their own awkwardness to blame.

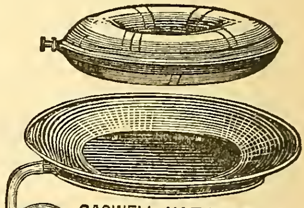


Fig. 113.—Cleveland's pan for vaginal irrigation.

Noeggerath and Lord have employed the ordinary bedpan with an escape pipe attached. A convenient but expensive apparatus is that of Merriam, shown in Fig. 112. A very neat and efficient, but also rather expensive contrivance, has been devised by Cleveland; a circular, hollow rubber cushion is placed on the flat, concave pan, and the patient thus lies very comfortably while the water escapes through the side tube. With all these devices it is important that the surface on which the vessel rests should be moderately hard and unyielding. If these methods do not answer, the injections, being generally given night and morning, may be used in a long bath-tub, the patient's hips being raised on a rubber cushion. Various gynecologists have endeavored to dispense with all these paraphernalia and difficulties by constructing injection tubes with broad rubber cups or plates to fit over the vulva, and efferent tubes to conduct the water from the vagina. Those of Mathieu-Kisch, Frank P. Foster, and Scarff are the only ones known to me. That of Foster, having the largest and best fitting cup, appears to me the most useful. I have not used it, but Dr. Emmet testifies to the tight fit of the cup and the entire absence of escape of fluid except through the efferent tube. Another advantage of these instruments with escape tubes is the protection of the vulva and perineum from the injection fluid which, as is chiefly the case when injections of *hot* water are used, may at first, until the parts become toughened, cause considerable pain when it escapes. When such hot injections are used it is always advisable to protect the perineum by a large sponge or napkin wet in cooler water. It should be remembered that water of a temperature which is perfectly comfortable to the comparatively insensitive vaginal mucous membrane becomes scalding when it touches the highly innervated external skin.

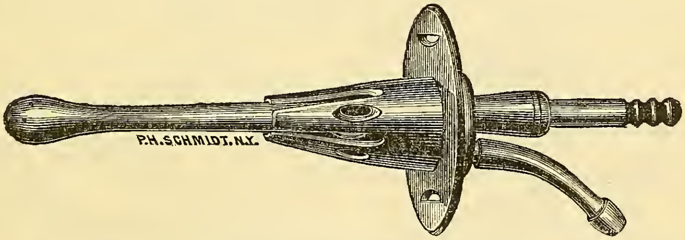

P.H.SCHMIDT.N.Y.

FIG. 114.—Apparatus for vaginal irrigation, with recurrent tube. (Mathieu-Kisch.)

The quantity of fluid to be injected at each sitting varies with the constitution of the fluid and the object in view. If merely cleansing injections are intended, a pint or quart will suffice. If disinfection is desired besides, the quantity should be larger and the flow should continue until the efflux is free from all impurities or odor. If an astringent effect is designed, a smaller quantity, a pint or less, will suffice, but it should be retained for some little time, five to fifteen minutes. If the injection is to act as a hemostatic, if it be a medicated fluid, only a small quantity is needed and it should be retained for fifteen minutes or longer ; if it be designed to act through its thermic qualities, the quantity should be large, the temperature—hot or cold—as high or low as can be borne, and the force considerable. If a stimulant or absorbent effect be intended, the quantity of fluid—always *hot* now—should be still larger, the force and the length of time of each sitting even greater. When a tonic influence is intended, the quantity of fluids should not be so large nor the temperature so high, but the force may still be considerable.

In accordance with the force desired the irrigator is to be elevated or depressed.

The frequency with which vaginal injections should be given varies from once to three or four times or more a day, according to the strength of the fluid and the effect desired.

It is evident that no special rules can be given in these general terms either for the exact quantity of injection fluid, the force of the injection, or the length of each sitting; all these must be determined by the peculiarities of each individual case and by the experience of the practitioner.

I have already stated that every vaginal injection, with the sole exception of the ordinary cleansing injection commonly used during health, should be taken in the dorsal recumbent position. This rule is especially applicable to the injections of water at a high temperature, the so-called "vaginal baths" of the New York Woman's Hospital, introduced into gynecological practice as a systematic therapeutic agent by Thomas Addis Emmet some fifteen years ago or more. Although he has repeatedly described the method and therapeutic rationale of these *copious, hot* water injections, and their method and value is familiar to all the pupils of Emmet and the institution in which he has officiated and taught so ably for many years, and to many specialists, neither the details nor the rationale of the method have been properly understood by the majority of the profession. This was certainly the case until the publication of Emmet's book less than two years ago; since then, I dare say, his peculiar methods have been studied by many who formerly had scarcely a suspicion of the details of modern gynecological practice. Notwithstanding, as this treatise is written for the young practitioner and embryo gynecologist, I will run the risk of being diffuse, and again point out the cardinal differences between the old methods of giving vaginal injections, and the new system as employed chiefly for the introduction of *hot* water into the vagina. Formerly the injections were taken in the erect, sitting, or crouching position, the temperature and quantity of injection-fluid were not at all or indistinctly prescribed, and the length of each sitting not specified.

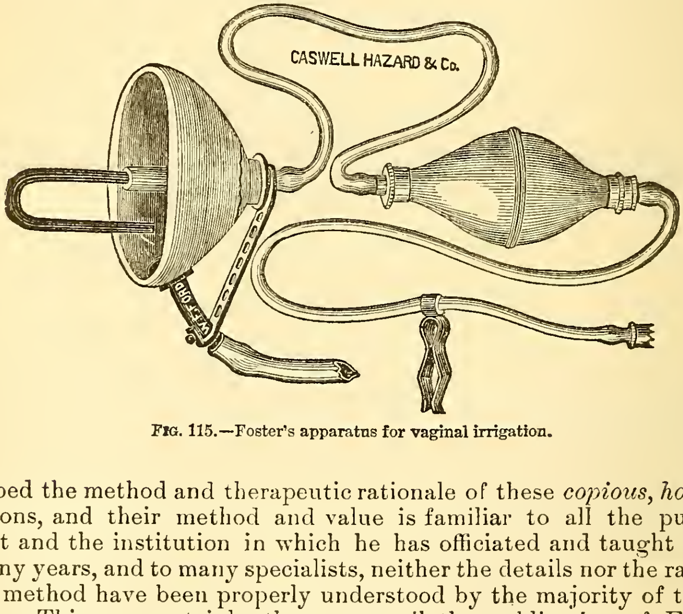


FIG. 115.—Foster's apparatus for vaginal irrigation.

The disadvantages of injections thus administered have already been enumerated.

The present method is as follows : The patient occupies the dorsal recumbent position, with elevated hips and depressed shoulders, lying on one of the various contrivances described above ; the outlet of the vagina should be higher than its vault, so that the canal is always distended by the fluid. The water should be as hot as can be borne, beginning with 100° to 105° F., and increasing a degree or more daily until 115° to 120° F., are reached. It is not necessary to exceed the latter temperature. The vessel containing the hot water should be suspended at least two feet above the couch of the patient, higher if more force is desired. The water is allowed to escape from the nozzle before introducing it, so as to expel the air. The nozzle may be dipped in cool water for a moment, if the injection-fluid be very hot, before passing it through the sensitive vulvar opening into the vagina. The vaginal tube should be passed along the posterior wall of the vagina into the posterior pouch ; if this is not done, its point may be introduced directly into the external ós and the uterine cavity injected, thus giving rise to severe or dangerous uterine colic. All this can be done by a patient of average intelligence and determination ; a nurse, of course, is a help, but not a necessity. A hot vaginal bath should be taken at least twice a day, and a quantity of water used each time, which will require at least twenty minutes to escape from the irrigator ; the latter will thus require refilling several times. These injections, in order to prove of benefit, should be continued regularly, with the exception of the menstrual periods, for months and even several years.

The influence of gravitation and the relief of venous congestion aimed at by the dorsal position with elevated hips is attained to a still greater degree in the knee-chest position. This position may, therefore, be adopted in aggravated cases when the fullest possible effect from the hot injections is desired. Its disadvantages are three-fold, viz. : the impossibility of patients, particularly such as may most require this treatment, remaining sufficiently long in the uncomfortable position, the difficulty of keeping the patient dry, and the scalding of the exceedingly sensitive vestibule and clitoris by the escaping hot water. The first objection is irremediable. The second and third can be met by using a funnel-shaped apparatus with rubber tube attached to the smaller end, or the double-current contrivance of Dr. Foster. In cases of obstinate leucorrhea, particularly of infectious character, this same knee-chest position is admirably adapted for the introduction by means of a syringe into the vagina of medicated fluids, which, in consequence of the distention of the vagina in this position, reach every fold and nook of the canal, and, being retained each time as long as the patient can bear the posture, exert a more permanent beneficial influence.

The chief points to be impressed on the patients in using these hot vaginal injections, are therefore : 1. Recumbent, or knee-chest position. 2. Water as hot as can be borne without distress. 3. Duration of each sitting not less than twenty minutes. 4. At least two sittings a day. 5. Introduction of the vaginal tube along the posterior wall. 6. Perseverance for months and years.

In his recent book Dr. Emmet expresses decided preference for the interrupted stream of a Davidson syringe over the constant current of the irrigator in all cases where he desires the stimulant and absorbent effects of the hot douche. That he is right in this view, will not be disputed. But the excellent results which he justly claims for the hot douche in the Woman's Hospital patients, have been obtained by the hot *constant* current, the irrigator being the apparatus used in the hospital. Very few patients will be found strong and willing enough to compress the bulb of a Davidson syringe for twenty minutes, and even the nurse is not to be envied to whom this task is delegated. Any one who has worked the air-bulb of a Paquelin thermo-cautery, during an operation, will appreciate the correctness of this observation. Only in hospitals and with wealthy patients with nurses at their disposal, will it be possible to insist upon the interrupted stream. I am confident that the constant current, if administered by the rules above given, will answer every reasonable expectation and meet with the hearty concurrence of the patients. Numerous cases of pelvic cellulitis, ovaritis, and areolar hyperplasia have proved to me, beyond the shadow of a doubt, the value of the hot constant current.

Before closing this section I wish to refer again to the construction of the vaginal tube in all forms of syringes. All tubes should be of hard rubber. The bulbous expansion of the tube should not be so large as to be difficult of introduction in virgins. The tube need not be curved. It should be sufficiently long to reach to the posterior vaginal pouch, about five inches. But above all, its olive-shaped tip should not possess a central perforation. The holes should all surround the tip, but the centre be imperforate. If the tube already in possession of the patient have this central aperture, it should be plugged with wood; or, if the tube be of the old variety and of malleable metal, it should be hammered up. That this anxiety on my part, concerning this central aperture, is not fancied has repeatedly been demonstrated of recent years to myself and others.

Many women possess lacerated cervices, or suffer from endocervicitis, and the external os gapes, or the uterus is low in the pelvis, and its external os points directly in the axis of the vaginal outlet. How easy is it for a woman to pass the point of the tube directly into the external os and force a stream of water or medicated fluid (particularly from a Davidson or other interrupted current syringe) straight into the uterine cavity and perhaps through the fallopian tubes. The danger from shock of forcibly distending the unimpregnated uterine cavity by sudden injection of fluid has deterred the majority of gynecologists from using therapeutic intra-uterine injections, irrespective of the possibility of the fluid's passing through the tubes and exciting peritonitis. The nature of the fluid is not absolutely material, for even water or glycerine has produced dangerous symptoms. It is therefore evidently of the highest importance to avoid this accident, which may occur at any injection with an improper tube. Until within a few years I had quite a number of cases of uterine colic, diffuse abdominal pain and tenderness, febrile reaction, reported to me by patients for whom I had directed simple vaginal injections of mild astringent solutions and even plain water. The symptoms came on immediately after or during the injection. I noticed that these cases appeared to be chiefly such as had lacerated gaping cervices, and the true solution of the mystery occurred to me. Since using nozzles without a central aperture, I have had no more accidents referable to involuntary intra-uterine injections. Since 1875, Drs. More Madden, of Dublin, Paddock, of Nashville, and Simmons, of Yokohama, have reported cases of severe collapse, and even peritonitis, following simple vaginal injections; and Dr. Petit, of Little Rock, Arkansas, relates three cases of death undoubtedly due to the same cause. Späth, of Vienna, also had a fatal result after the injection of a solution of acetate of lead; the post-mortem revealed the sulphide of lead on the ovaries.

The instrument-makers are difficult to move from their beaten path. It was only after repeated directions that I succeeded in inducing mine to conform with my wishes regarding the closure of the central aperture. Physicians will do well to insist that the tip of every vaginal tube furnished them or their patients shall possess the regulation shape of an olive, or at least a bulbous expansion with a certain number of openings around the crown of the bulb, but none at the very tip. Slender, pointed vaginal tubes with central aperture should be utterly condemned.

Composition of vaginal injections.—The injections used for cleansing may consist of simple tepid water or of suds of castile or tar or glycerine soap, or a weak solution of carbolic acid (1 : 200), permanganate of potash (only enough to give the water a light pink color); or bicarbonate or borate of soda may be used, if the vaginal secretion is very acid. Injections of cold water should not be used habitually, unless as a therapeutic agent under medical direction, in relaxed and enfeebled conditions of the pelvic organs.

Injections for therapeutic purposes consist either of pure water, in which case they are either *hot* or *cold*, and act wholly by their thermic properties, and by the shock exerted by the force which propels them; or of solutions of medicinal agents. The thermic influence of vaginal injections decidedly exceeds that of the ordinary mild medicated injections, the mildness of which is regulated to a great extent by their necessary contact with the external genitals as they escape. A vastly greater effect is exerted by a very hot or a very cold injection than could result from any medicated solution of justifiable strength. The exact temperature of the water used for injection is a matter of importance. Between the degrees of 35 and 55 F. the water may be considered *cold*, between 55 and 70 *cool*, between 70 and 85 *tepid*, between 85 and 100 *warm*, and above 100 *hot*. When directing the temperature of a vaginal injection it is well to specify the exact degree at which the injection should be begun, and the ratio at which the temperature is to be increased or diminished.

Cold vaginal injections, formerly in universal use, are now but rarely employed, except in cases of postpartum and other hemorrhage. When I say that they are but rarely employed, I mean by direction of the gynecologist. Without such direction I am sure they are employed in many instances where they should not be, and where they do either no good or actual harm. Thus, in congestions and inflammations of the pelvic organs, cold water injections are doubtless still recommended by physicians of the old school to whom the more rational teachings of the present day are unknown or unpalatable.

Formerly, cold and ice water was employed in all cases where contraction was desired, and tepid water injections were then habitually recommended. Hot water was entirely disregarded as a therapeutic agent in uterine disease. It is only within a few years that the profession have gradually become aroused to the value of this agent; but once aroused, the revulsion in this particular has been marked, especially in this country. While the Germans and English have recognized the value of hot water as a styptic, chiefly in postpartum hemorrhage, the American gynecologists have introduced it into gynecological practice. Where formerly cold was employed, heat is now used and attains the same object with more certainty and permanence, and with less discomfort to the patient.

The rational and therapeutic application of hot water as now employed in uterine disease will be considered under the head of Indications.

Tepid injections, so generally recommended and inadvertently used by the patients in place of the hot injections directed, have no positive therapeutic effect whatever; they act merely as a warm bath does on the body, by cleansing and soothing the surface, and removing the secretions.

The list and variety of medicated vaginal injections is large. The medicinal agents employed in this manner in solution belong either to the class of disinfectants, astringents, alteratives (promoters of absorption) emollients, narcotics.

The *disinfectants* in ordinary use and their proportions are: carbolic acid (½—1 to 100), thymol (1 to 1,000), permanganate of potash (1 to 1,000), liquor sodæ chlorinatæ, Labarraque's solution (1 to 2), chlorine water (1 to 2), salicylic acid (1 to 1,000 hot water) sulphite of soda (1 to 200).

The formula used in the Maternity Hospital, New York, for a disinfectant solution of thymol, is as follows:

℞.	Thymol	ʒ j.
	Glycerinæ	℥ j.
	Alcoholis	℥ viij.
	Aquæ, q. s. ad.	Oj.
M.	Sig.—Sol. thymol	ʒ j. to Oj.

Of this sufficient is poured into warm water to give it a distinct odor of thymol, and then injected. This is an excellent and agreeable addition to water for washing the hands after examination, and in no wise affects the skin, as carbolic acid solutions do.

There is comparatively little difference in the disinfectant properties of these various preparations; if used in sufficient quantity and strength they all answer their purpose. The most popular for vaginal injections are the carbolic acid, thymol and permanganate of potash solutions; certain gynecologists prefer the chlorine water, and others the salicylic, such preference being usually merely the result of habit or a matter of taste. One point of preference of the permanganate of potash solution is its oxygenation of all dead substance and its change from violet red to a brown color thereby; when all effete matter is removed, the fluid escapes in its original violet color. The sulphite of soda solution is specially adapted to cases where the presence of vegetable fungi on the vaginal mucous membrane are the cause or maintainer of a secretion. In all disinfectant applications it is important that the stream be continued until it returns perfectly free of odor and débris. The irrigator therefore is the most convenient and practical apparatus for their administration.

One of the best *astringents* is cold, or rather ice water. Its effects can be attained either through the strong general or local shock when its application is but momentary, or through the permanent contraction of the blood-vessels when the contact is continuous. The objections to its use as an astringent are the unpleasant shock and chill it gives to the patient, and the evanescence of its effects, since a blood-vessel contracted by cold expands to a greater calibre when the inevitable reaction ensues; if used for congestion or hemorrhage, therefore, cold must be applied continuously until permanent contraction is obtained or a clot forms in the bleeding vessel. The contractile effect of *hot* water, however, is more permanent, if the application is not too short; and the unpleasant shock and reaction of cold applications do not occur. According to the present idea, hot water is, therefore, to be preferred as an astringent and styptic to cold water. If the influence of medicinal astringents be desired in addition to that of heat, the last pint or two of a hot injection may be medicated; and this is the best method of administering these remedies.

The medicinal astringents used for vaginal injections are of both mineral and vegetable origin. The minerals are: the sulphates of zinc, alumina, copper; the nitrates of silver and alumina, the persulphate of iron; the tincture of the chloride of iron, the permanganate and chlorate of potash; the acetate of lead, the chloride of zinc. The vegetable astringents are chiefly such as contain tannic acid: pure tannic acid, decoctions of oak bark, cinchona bark, nutgalls, willow bark; claret-wine, vinegar, pyroligneous acid. The strength of the solutions of the zinc, alum, silver, copper, lead, and iron salts, is generally one to two per cent. The permanganate of potash will require to be used at the strength of 1 to 400, at least, if any effect is to be produced as an astringent. The objection to it are the stains produced by it on the linen, an objection quite as valid as regards the solution of silver nitrate, iron and tannin, all of which make almost indelible spots. The tannin is used in proportions of 4—5 to 100 parts. If applied early, oxalic acid will remove the stains of tannin. Of the various decoctions of barks containing tannin mentioned, the proportion used is generally one ounce of powdered bark to one quart of water, keeping the amount of water always the same until the active principles of the bark are thoroughly extracted; after being strained, the decoction is ready for use, and may be bottled and put away indefinitely. A vegetable astringent which I have used with good results in vaginal leucorrhea, chiefly of the subacute type (vaginitis), is the fluid extract of hydrastis canadensis, ½ to 1 ounce to the pint. Astringent injections should be used cool, perhaps even cold, if the patient bears such a temperature well. It is an excellent rule to wash out the vagina with tepid water, or with a weak disinfectant before introducing the astringent solution; or the mucus may be removed by a mild injection of caustic potash or soda (1—2 to 1,000). If the solutions are mild, and the salts contained in them do not exert a corrosive action on metal or rubber, they may be injected with the ordinary metal and rubber syringes and irrigators. If they are corrosive (as the nitrate of silver, iron, permang. potash), a large straight glass syringe should be used. The nitrate of silver is but rarely employed as an injection, because the quantity necessary for an injection would render its habitual use rather expensive, and because it has been found that more good is done by the application through a speculum of a stronger solution than would be advisable as an injection by the patient herself.

A combination of astringents often acts much better than one alone, and the article should occasionally be changed. The addition of carbolic acid (1 to 100) to mineral astringent injections often proves beneficial, particularly if there is a subacute vaginitis present. A combination frequently used by me in cases of vulvo-vaginitis with profuse yellowish discharge and highly congested vaginal mucosa, is the sulphate of alum and of zinc, the borate of soda and pure carbolic acid, of each one ounce, dissolved in one quart of water; of this two to four tablespoonfuls are added to a pint of tepid water, and such a pint is injected every three to four hours, always preceded by a tepid water or soapsuds injection. As a rule, astringent injections should be so administered as to keep the solution in the vagina for at least a few minutes; the recumbent position with elevated hips is therefore *the* position for the purpose. I am aware, however, that very few vaginal injections are administered in this manner, the large majority of women using the crouching or sitting posture, and deriving proportionately less benefit. It is important always to caution patients against the staining of their linen by an injection fluid, and to recommend them to wear napkins after the injection when such a fluid has been prescribed. As a rule, agents which do not permanently stain the linen should be chosen for ordinary injections; if other articles, such as tannin, nitrate of silver, iron, or strong solutions of permanganate of potash, are employed, it will be found more effectual to apply them through a speculum two or three times a week, at a strength proportionate to the effect desired, and to direct the milder, non-staining injections in the interval. This is the manner in which I treat the majority of cases of chronic leucorrhea or vaginitis, whenever, be it understood, that symptom is sufficiently intense to require local treatment.

The best *alterative*, stimulant injection for the promotion of absorption of the products of pelvic peritonitis and cellulitis, and of the redundant tissue in subinvolution and hyperplasia of the uterus is always hot water, in large quantities, propelled with a certain amount of force. But, where this force is not obtainable and even where it is, the addition of some substance containing iodine has been found to be of value. We thus add to the hot water a certain proportion of simple or compound tincture of iodine (ʒ j. to the pint), or iodide of potash in the same or stronger proportion; or sea- or rock-salt (½—1—2 ounces to the pint, or a handful to the basin of water); or the imported brine from the baths of Kreuznach, Kissingen, or Reichenhall (pure or diluted one-half) should be added to the solution. As it is the iodine and bromine contained in these salts and fluids to which the alterative effect is due, the coarser the preparation the better; I therefore always recommend the common, unclarified salt in preference to the nicely prepared sea- or table-salt. The salt solutions are, in my opinion, more beneficial than the weak iodine injections. In all cases, it is essential that the water be as hot as can be borne. The addition of iodide of potash to the injection-fluid will probably be feasible only in the better class of practice, since the expense of the drug will render its employment in the quantity necessary to prove beneficial as injection inexpedient for poor patients. In my opinion, common rock-salt answers quite as well. Patients living at the seashore, can use ordinary sea-water heated to the desired degree as a vaginal injection.

The *emollient* injections consist of decoctions of flaxseed, slippery-elm bark, marshmallow root, poppyheads, gum arabic, milk, glycerine, melted vaseline, sweet or castor oil, etc. They are used in acute inflammatory conditions and wounds of the vagina, as they may occur after difficult forceps labors, burns from caustics, and after the operation for stenosis or atresia vaginæ. Their object is expressed in their name. The decoctions should, of course, be strained; the glycerine may be used pure, or mixed with water in different proportions. All the decoctions and the glycerine may be injected through the ordinary rubber syringe; the oils are best applied through a glass syringe, as the rubber is difficult to clean. All emollient injections should be used at a tepid temperature, unless the patient prefers them cool.

Irrigation of the vagina with tepid water, if long continued, acts as an emollient, and local as well as general anesthetic, precisely as a warm bath soothes general irritability.

Narcotic injections contain various quantities of the narcotic drugs, chiefly opium, hyoscyamus, and conium, also stramonium. Thus, one drachm or more of the tincture of one of these agents may be added to the pint of warm water, and the injection repeated as often as occasion demands. Or the infusion or decoction of poppyheads may be used. Or one of the bromides (of potash, sodium, ammonium) may be dissolved in water in the proportion of ʒ j. to ℥ ss. to the pint, and injected. Or the hydrate of chloral may be used in somewhat smaller quantity (ʒ j.—ij to the pint); this agent also acts as a disinfectant, and is, therefore, particularly indicated in cases of cancer, where disinfection and local anesthesia are both desired.

The bromides I have found of real benefit, in cases of so-called "irritable uterus," diffuse pelvic pains, hysterical hystero-neuroses in various parts of the body. Injections containing them are best administered at bedtime. I have repeatedly seen a refreshing night's sleep follow the vaginal injection of one drachm of bromide of potash to a pint of water.

The opiates and other narcotics first named may also be used in similar conditions, but are more applicable to cases of uterine cancer. All these injections should be taken in the regulation position with elevated hips, and the patient should remain in that position for fifteen to thirty minutes afterward.

The *indications and utility of vaginal injections* have to some extent been incidentally referred to in the previous sections.

I may mention here one species of injection which I have not before referred to, viz., that of alkaline solutions for excessive acidity of the vaginal discharge, whereby the spermatozoa are killed and sterility ensues. This acidity predominates in blondes, especially with red hair (Pajot), and is easily detected by the peculiar odor on withdrawing the finger or passing the speculum. Injections of carbonate and borate of soda and carbonate of potash, ℥ ss. to the pint, or stronger, have been recommended since Sims' investigations on the causes of sterility, to be used before retiring to rest each night. Byasson advises a liquid for the purpose, composed of two ounces of phosphate of soda, one white of egg, to one quart tepid water, in which spermatozoa have been kept alive for twelve days at a temperature of 36° C.

It is perhaps not out of place to say a few words here about the indications for the use of ordinary tepid, cleansing, vaginal injections. As a rule, the physician is not consulted either as to necessity, time, frequency, or counter-indications of these injections. But he should consider that he may do good and avert damage by counselling his patients in this matter. It is surprising how little even educated women think of attending to the regular cleansing and bathing of their sexual organs. They may take full baths occasionally, but in the interval it does not occur to them that their vulvar and anal regions need quite as much (if not more) washing than their hands and faces. Every woman, indeed, should wash her genitals with a soft cloth or sponge after each urination, and certainly every morning and evening. A vaginal injection is, of course, not necessary so often. Women who do not suffer from habitual leucorrhea need not cleanse their vaginal canals but once a week or so; if they have a habitual discharge, one or two injections a day should be used, generally of some mild astringent, alkaline solution, or of soapsuds. A very common time for a vaginal injection with those of our ladies (unfortunately, by far too large a number) who desire to prevent increase of family, is immediately after sexual intercourse. It should be understood by the physician and impressed upon the lady, that such injections, aside from the morality of the proceeding, are objectionable and injurious, no matter whether the water used be cold or warm, or medicated. While a cold injection is positively injurious by the sudden shock the cold gives to the (at that time) highly vascular, and congested pelvic organs, and by the inevitable, chronic congestion of these organs which must, in time, follow this interference with nature, even warm injections act harmfully by removing the emollient seminal fluid in which the turgid organs are bathed after coition. Look upon the evils of a too rapid succession of pregnancies and the prevention of this evil by the checks so enthusiastically advocated by the disciples of the Malthusian school, in whatever light we may, we cannot close our eyes to the indisputable fact that all such interference with the physiological performance of the function of reproduction—with the designs of nature, as some express it—is wrong, and will sooner or later bring its own retribution.

During the menstrual flow, of course, vaginal injections are prohibited, not that a gentle, tepid injection would do harm, but because the popular voice and opinion is against them and they are not necessary. But, after the cessation of the flow, a tepid, cleansing injection would be both proper and serviceable in removing the débris of the uterine flow.

It is scarcely necessary to point out more specially in what class of cases the vagina needs to be washed out antiseptically, as the character and amount of the discharge will be sufficient indications for the necessity, frequency, and strength of the injection.

The indications for astringent injections may also be briefly summed up under two headings : a vaginal discharge of mucous or mucopurulent character, and hemorrhage from uterus or vagina. In acute or subacute inflammatory conditions of the vagina or cervix, with or without abrasion of epithelium, the nitrate of silver solution is the best application. As already stated, it is advisable to apply it repeatedly through a speculum, and direct a mild astringent injection three or four times daily in the interval. For ordinary leucorrhœa the astringents already enumerated may be either used alone, or in the interval between stronger applications made through the speculum.

In hemorrhage, which is usually from the endometrium or the cervix, rarely from the vagina proper, the thermic astringents, very hot or very cold water, will act better than *mild* medicinal astringents. Concentrated solutions cannot be applied as injections for reasons already stated, but must be introduced through a speculum, and will doubtless be required in all cases of obstinate or profuse hemorrhage. If the hemorrhage comes from the endometrium, it will be arrested only by the influence on the whole pelvic circulation of high or low temperature, and I have already stated my preference for hot water. Still, I have occasionally seen uterine hemorrhage checked by the injection of vinegar and ice-water, equal parts. If the flow be a menorrhagia—profuse menstruation—especially, but even in any uterine hemorrhage other than mere stillicidium from vascular relaxation, a cold styptic injection is hazardous, since it might not only arrest the flow, but also produce the undesired result of lighting up a pelvic cellulitis or peritonitis. This, hot water would not do. If the hemorrhage proceeds from an accessible surface, it is always best to endeavor to arrest it by direct applications through a speculum, which may be followed and confirmed by hot injections, medicated or not, rather than attempt the, as regards permanent effect, rather uncertain injections, hot or cold. Although a direct styptic or astringent effect is not expected on the endocervical surface, the fluid of a vaginal injection will enter the cervix if the external os is patulous or positively gapes, as is the case after ununited laceration and chronic endocervicitis. Thus applied, injections may act beneficially on pathological conditions of the cervix.

Astringent injections in chronic vaginal discharges generally require to be continued for a long period, and the astringent should occasionally be changed, if the one in use proves ineffectual after a fair trial of several weeks ; or the strength should be increased.

The indications for alterative, emollient, and narcotic injections have already been referred to. The most valuable results are obtained from the alterative injections in cases of areolar hyperplasia or subinvolution of the uterus, and acute, subacute, and chronic inflammation of the pelvic peritoneum and cellular tissue. The treatment of these affections without the assistance of that greatest of all alteratives, heat, would be discouraging indeed. And this brings me to the discussion of the rationale of hot injections as a therapeutic agent in producing contraction of blood-vessels and absorption of hyperplastic tissue and plastic exudation.

The immediate effect of cold when applied to a living tissue is to produce shrinking of the tissues and reflex contraction of the blood-vessels ; when the cold is removed, this effect rapidly wears off and the, in every animate body, inevitable reaction follows, the blood-vessels dilate to a still greater calibre than before, and the congestion is increased instead of diminished. With heat the order of effect is reversed : First, the capillaries are relaxed, the tissues swell, but soon the stimulus of the heat excites reflex action, the vessels contract and the tissues shrink, and this effect continues much longer after the removal of the heat than it does after the application of cold. Besides, the nutrition of the part is not interfered with by heat, as it is by cold ; for the relaxed capillaries regain their tone, and transmit the blood more rapidly, while the contraction of cold is so severe as to arrest circulation entirely, if continued. Thus in their immediate effects extreme heat and extreme cold are identical ; it is in the permanence of the effect, and in its influence on the faculty of absorption that they differ. The contractile effects of continued heat are vividly exemplified by the bleached and shrivelled hands of washerwomen, and the blanched appearance of the skin under a poultice (Emmet).

According to Emmet all pelvic congestion is venous, and the term "chronic inflammation," so far as it applies to the organs in that cavity, is a misnomer, simply because the arterial vessels are not involved in that process. Although hot water will contract the arterioles also and thus perhaps abort an attack of acute inflammation, it is mainly in the chronic venous congestion constituting the chief factor in subinvolution, hyperplasia, and old pelvic hyperemia, that its use is so eminently beneficial. Its effect is naturally greatly enhanced by raising the hips and aiding the emptying of the veins by gravitation. This point is particularly insisted upon by Emmet. The unloading of the venous plexuses by gravitation is assisted and confirmed by the hot water, and the contraction of the vessels maintained by keeping the patient in the recumbent position for some time afterward. The most benefit is therefore derived from the hot injections when given at bedtime, the patient not rising from her couch until the next morning. It is obvious that success in this treatment, that is, permanent restoration of tone and calibre of the blood-vessels, depends mainly on the high degree of temperature, large quantity, long duration, and steady perseverance with which these injections are administered, not omitting the proper position with elevated pelvis.

Little by little, as the patient improves, the temperature of the injections may be gradually, almost imperceptibly lowered, the amount and force reduced, and but one injection a day given, until the temperature of 60° is reached and they are discontinued. Emmet advises their continuance for some months for several days after each menstrual period, at a temperature slightly above blood heat, in order to avert any relapse at this critical period, and also at a higher temperature, if from any cause a pelvic congestion or inflammation seems imminent at any time.

The value of these systematic, carefully administered, and perseveringly continued copious hot vaginal injections is certainly not overestimated by their author and chief advocate, Emmet. Hot injections in uterine disease, it is true, were recommended years ago by Sédillot, Trousseau, Kiwisch, and Scanzoni, but never with the degree of system and perseverance necessary to a successful result. It is certain that they fell into disuse, except in the one instance of the artificial induction of premature labor by the forcible hot vaginal douche according to Kiwisch; and when I was studying gynecology under Scanzoni, twelve years ago, no mention was ever made of this treatment for female pelvic affections. It is true, that warm baths and injections of brine were recommended, but the chief benefit of these baths was attributed to the mineral constituents, not to the hot water. Since then the revulsion of feeling has been so great that cold water injections have fallen almost entirely into disuse, and hot water has been substituted for it in all classes of uterine disease by all gynecologists who follow the lead of the modern pelvic pathology so ably and logically demonstrated by Emmet. The importance of carefully attending to all the details of this treatment, as described at length in the preceding pages, should be impressed on both physician and patient as essential to success.

To give special indications for hot vaginal injections scarcely seems necessary after all that has been said here on the subject. Suffice it to say, that they are indicated in all conditions of chronic venous congestion of the pelvic organs, in subinvolution and hyperplasia of the uterus, particularly; further, in chronic ovarian congestion, so-called "chronic ovaritis," and in all cases where the pelvic cellular tissue presents evidence of the previous occurrence of inflammatory exudation and subsequent induration, so-called "chronic pelvic cellulitis and peritonitis." Further acute attacks of this latter affection, or of metritis or ovaritis, may be aborted by hot injections, if used at the very outset. Acute, subacute, and chronic vaginitis, leucorrhea from want of tone of the vaginal tissues, are also indications.

Nervousness and sleeplessness in a hysterical woman may be allayed by prolonged hot vaginal injections at bedtime, in very much the same manner as a long warm sitz-bath will quiet and induce sleep.

An indication which is not ordinarily considered in directing the prolonged use of hot vaginal injections, is that of hemostasis. But the rationale is the same as when they are used in venous congestion, viz., the contraction of the blood-vessels. Hot injections are therefore indicated in cases of uterine or vaginal hemorrhage, chiefly when the bleeding surface can be directly touched by the water, as in erosions, granulations, laceration, epithelioma, or real carcinoma of the cervix. But even when the flow comes from the uterine cavity, as in menorrhagia from whatever cause (functional, vegetations, fibroids, sarcoma), the contraction of all pelvic blood-vessels by the heat will diminish the flow from the uterus, although the bleeding surface is not directly touched. It is thus not only allowable, but advisable (unless special counter-indications exist) to control or check a profuse menstrual flow by hot injections. No harm can result from this practice, wherein it differs decidedly from the not uncommon but hazardous use of cold injections for the same purpose. Before operating on the external genitals, vagina, or uterus, a very beneficial effect can be produced by rendering the parts anemic by hot water applications or injections immediately preceding the operation. The saving of blood to the patient, and the convenience of but slight oozing to the operator, are points well worth considering.

Counter-indications and dangers.—I know of but one objection to a proper vaginal injection for a given case, and that is the possibility of injecting the fluid directly into the uterine cavity. The manner in which this occurs, through a lacerated or gaping cervix and patulous internal os, particularly in a retroverted and prolapsed uterus, and the dangers of this accident have already been fully discussed. Also the means of averting it. Other than this, I can conceive of no condition in which a properly indicated injection (hot, cold, or medicated, as the case demands), could be injurious when carefully applied according to the rules above given. I need scarcely say that pregnancy would, of course, counter-indicate a hot injection. Emmet speaks of occasionally meeting cases in which so much discomfort and pelvic weight was experienced after the hot injections, as to lead him to discontinue them. He confesses his inability to explain the why and wherefore of this occurrence, but says that he long since found that the injection in these cases is well borne, if the temperature does not exceed 95° at first, and is very slowly increased. I have noticed similar effects, besides hearing complaints of faintness, weakness, and nervousness as immediate consequences of the hot injection. I have invariably overcome these symptoms in the manner prescribed by Emmet.

The possibility of lighting up a fresh or rekindling an old pelvic inflammation by the forcible injection of hot water into the vagina, which has been advanced by some of the old school gynecologists, is not to be admitted for a moment. The first instance of such an occurrence is still to be reported.

b. *Through Specula.*

The *indications* for the application of medicinal agents to the vagina or cervix through the medium of a speculum are such conditions of these parts as call for direct treatment with substances too concentrated to be used by injection. Such conditions are: *Cervix:* Erosion with or without papillary hypertrophy, laceration with eversion and cystic hyperplasia, endocervicitis with patulous os; ordinary areolar hyperplasia, malignant disease, specific ulceration. *Vagina:* Acute vaginitis, granular vaginitis, obstinate chronic leucorrhea, venereal warts. Experience has shown that the allowable strength of vaginal injection fluids is entirely inadequate to exert the necessary irritant astringent or styptic effect on these conditions, and that powerful caustics, astringents, or styptics must be directly applied to the diseased surface. This is possible only through one of the various forms of specula, by which the healthy tissues are protected from the agent. In this manner either the cervix alone, or cervix and vagina, or any one portion of the vagina may be touched by the agent, without the normal internal or external parts being affected.

Besides the conditions of the cervix and vagina named as calling for strong direct applications, there are subacute and inflammatory processes in the pelvic cellular tissue and peritoneum and the ovaries, which are much benefited by the application of strong counter-irritant or absorbent agents to the vaginal roof. I have met with excellent results from such measures in chronic pelvic cellulitis and peritonitis and chronic ovaritis, if continued persistently for a long period in conjunction with the systematic use of hot injections.

Occasionally a hyperplastic condition of the vagina is met with as the result of chronic vaginitis, a so-called pachy-vaginitis chronica, which is relieved by similar strong absorbent applications.

In areolar hyperplasia and subinvolution of the whole uterus, I have found applications to the whole intravaginal portion of the cervix of strong tincture of iodine to aid the hot injections in reducing the enlargement and to relieve very decidedly the peculiar local neuralgic and general hysterical symptoms so commonly met with in those affections. Such relief, to be sure, is generally but temporary; still, in such intractable affections as old hyperplasia uteri even that much is worth having.

The most common conditions in which the application of concentrated agents in substance or solution to the vagina or cervix is indicated are: hypersecretion of the vaginal mucous membrane, either acute or chronic; erosion of the cervix and external os, and malignant disease of the cervix.

An application, which is frequently required, as a styptic and caustic, in malignant disease of the cervix, is the actual cautery, either by means of the old-fashioned cautery iron, Paquelin's thermo-cautery, or the platinum tip of the galvano-cautery battery.

Substances applied through the speculum, and manner of applying them.—Any of the medicinal agents enumerated in the preceding chapter as serviceable in a highly diluted condition as vaginal injections, may be applied to the cervix or vaginal walls, in a pure, or more or less concentrated state through a speculum. But, by no means all of these agents are so applied, since some of them can be replaced by remedies of greater efficiency in their concentrated form, and the use of others has by custom been confined to injections. Thus, we are not in the habit of applying the acetate of lead, the sulphate of zinc, the permanganate, or the chloride of potash, the salicylic acid, sulphite of soda, etc., in substance or concentrated solution through a speculum; not that they might not be so used beneficially, but that we have other more efficient agents which the speculum permits us to use safely. On the other hand, there are powerful remedies, like concentrated nitric acid, bromine, chromic acid, acid nitrate of mercury, caustic potash, which are not used in dilute solution, but exert their best effects when applied in a concentrated form.

The effects to be obtained from the various agents are either astringent, caustic, alterative, hydragogue, emollient, or narcotic. Of *astringents*, those chiefly used in substance, or strong solution, or otherwise, through a speculum are: tannin, hydrastis, alum, sulphate of copper, tincture of chloride of iron, persulphate of iron, acetic acid; *caustics:* nitrate of silver, carbolic acid, nitric acid, chromic acid, bromine, acid nitrate of mercury, sulphurous acid, caustic potash, actual cautery; *alteratives:* iodine, in form of simple or compound (Churchill's) tincture, iodide of potash in concentrated solution, iodoform in powder or solution, iodide of lead, unguentum hydrargyri; the only *hydragogue* is glycerine; *emollients:* olive, or poppy oil, vaseline, powdered flaxseed, or slippery-elm bark; *narcotics:* extract or tincture of opium, or belladonna, or conium, hydrate of chloral, bromide of potash, sodium, or ammonium, iodoform.

In accordance with the chemical properties of these agents they are applied through the speculum in substance (stick, crystals, powder), or in a fluid or unctuous form.

If applied in substance, they may be either withdrawn at once on the attainment of the object (as after cauterization with stick of nitrate of silver, or crystals of chromic acid), or left in apposition with the diseased surface for a greater or lesser time, the healthy parts being protected by cotton wads. If used in fluid form (solution, or natural fluid, as nitric acid, sulphurous acid) they may either be withdrawn at once, or remain in contact with the tissues by being conveyed on, or retained by cotton wads, introduced through the speculum.

a. Substance.

The agents which may be, and frequently are applied in substance (stick, crystals, or powder) are: nitrate of silver, chloride of zinc, caustic potash, chromic acid, tannin, iodoform, persulphate of iron, alum, sulphate of copper, iodide of lead, hydrate of chloral, the bromides.

The *manner of applying* these substances is by means of one of the three main varieties of specula (tubular, bivalve, Sims). As the stronger agents are generally applied merely to the cervix, the introduction of a large tubular speculum, if such a one be used, is advisable in order to obtain a view of the whole cervix. The application is then made by more or less thoroughly touching the diseased surface with the stick, if nitrate of silver, sulphate of copper, or caustic potash, be used; or thrusting the crystal or powder against the cervix with a spatula or cotton-wrapped stick (Fig. 116), if the substance employed be in that form. Only tannin, iodoform, iodide of lead, persulphate of iron, alum, sulphate of copper, chloral, and the bromides, may be retained in contact with the cervix for twelve or twenty-four hours, the stronger salts should be removed after a few minutes by wiping them off with a sponge on a holder, or the cotton-wrapped rubber stick, or by a tepid injection. The effects of a caustic being generally immediate, there is nothing to be gained by leaving an excess of it in contact with the cauterized part; the excess should therefore be removed or neutralized, and this is done in the case of the nitrate of silver by an application or injection through the speculum of a solution of chloride of sodium.

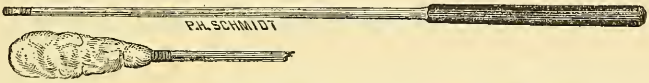


FIG. 116.—Straight whalebone stick, with notched end, for wrapping cotton around end, as shown in smaller cut.

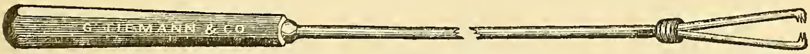


FIG. 117.—Sponge-holder.

For all applications (solid or fluid) to the cervix alone, the cylindrical speculum surpasses the other forms, provided the vaginal orifice permits the introduction of a sufficiently large tube to fully expose the cervix. The speculum should not be too large, however, as in that case portions of vagina might readily slip into its lumen beside the speculum and be cauterized involuntarily. If the agent is to be kept in contact with the cervix for some time, care is taken that the excess be not too great, and a wad of cotton tied about its middle with a stout string is introduced up to the cervix and firmly held there with the dressing-forceps while the tube is withdrawn; the string then projects from the vulva and allows the removal of the cotton by the patient herself. This cotton tampon may be either dry or, what is preferable, wet and squeezed out, so that the crystal or powder will better cling to it and remain where it was placed. Or, the tip of the conical tampon (wet or dry) may be sprinkled with the powder and introduced directly against the cervix.

In profuse hemorrhage from the cervical cavity, as may occur in cervical cancer (it once happened to me while curetting the cervix to open an arroded branch of the uterine artery, with the result of almost fatal hemorrhage), it may become necessary to throw in the styptic, preferably the powdered persulphate of iron, by the spoonful, until the hemorrhage is arrested. I have thus packed the bleeding cavity full of the powder, each subsequent spoonful coagulating the blood which oozed through the preceding powder until a sufficiently firm clot was formed to arrest the bleeding. The application of styptic solutions on cotton to the bleeding surface would scarcely suffice to arrest hemorrhage of so violent a character as that which I have just described. When a firm coagulum has once been formed, it is well to support it by pressure with a column of tampons, as to be described hereafter. The styptic should be kept as much as possible from the sound parts, particularly the vaginal surface. While the more powerful agents are applied only to the cervix, the milder powders and crystals, such as tannin, iodoform, and alum, are employed also in inflammatory or relaxed conditions of the vaginal mucous membrane. Either of the powders named may be thrown into the speculum by means of a spatula or spoon, and then, being pushed forward toward the cervix, is brought in contact with every part of the vagina by rotating and withdrawing the speculum until its point almost reaches the orifice, when it is again introduced merely half-way and a round tampon placed in the speculum and held *in situ* by the forceps while the tube is removed. In this manner the powder-covered walls of the upper portion of the vagina are allowed to approach each other, and the powder is not pushed up into the fornix, as will be the case if the tampon is introduced as far as the cervix. Or, the tampon may be moistened, squeezed out, rolled in the powder, and then pushed up to the cervix, when the conical shape of the tampon will place and keep the powder in permanent contact with the whole vaginal circumference.

The substances named may be applied pure, especially the tannin. But pure alum is generally too strong, and gives decided pain; it is therefore best diluted with equal parts of sugar. The strong unpleasant odor of the iodoform renders it decidedly objectionable to patients going about their daily duties and mingling with other people. When mixed with equal parts of tannin, or with Peruvian balsam, the iodoform loses much of its odor, and proves a very efficient antiseptic, astringent, and alterative.

I have described the application of stick and powders to cervix and vagina through the tubular speculum, which is essentially similar to their use through the bivalve; with the latter, however, great caution should be observed to prevent the agent, if powerful, from touching healthy tissue; and the application of powders to the vagina is not as convenient as through the tube. Still, it can readily be done in the same manner by withdrawing the bivalve and closing the lower half of the vaginal canal with a tampon. These tampons, when used merely as estoppers to the escape of the powder, are best introduced perfectly dry, and should be conical in shape (see Fig. 122). Through the Sims speculum powders are best applied on a tampon, the surface of which has been covered with some emollient as vaseline, or which has been dipped in glycerine or oil. I frequently use them in this way in leucorrhea, and chiefly in prolapse of the anterior or posterior vaginal wall, or both, with descensus uteri, when I wish to introduce a tampon of sufficient size to insure its retention. If but one wall of the vagina is prolapsed or relaxed, the powder on the tampon may be limited to that portion which is placed against the prolapsed part. In widely gaping vaginæ the tampons may be introduced by the patients themselves ; and in any case they should be retained by a **T**-bandage.

The powdered flaxseed and slippery-elm bark may be enclosed in small muslin bags of the size of an English walnut to a hen's egg, and securely tied with string; they are then dipped in boiling water and introduced up to the cervix, either by the physician through a speculum, or by the patient's fingers, while the latter occupies a dorsal position, and are retained for from twelve to twenty-four hours. The soothing emollient effects of these poultices is beneficial in various inflammatory disorders of the pelvic organs (chronic cellulitis, ovaritis and metritis). By the addition of one-fourth to one-half teaspoonful of powdered alum, borax, or sulphate of zinc to the flaxseed or elm-bark, the poultices may be made astringent as well as emollient and absorbent. Powdered myrrh is also reported to be an excellent stimulant adjuvant, as also the powdered root of sanguinaria canadensis.

If a powerful caustic, as chromic acid or caustic potash, is applied to the cervix through the Sims, it is best to protect the subjacent part of the vagina by packing cotton between it and the cervix, which is removed when the application is completed and all excess of the remedy wiped off or neutralized.

If any portion of the vagina is to be touched, as in case of ulceration from pressure by a too long worn pessary, or ulceration of any kind, or venereal papillomata, the Sims speculum allows the best exposure of the part. The caustics used to the vagina are either the nitrate of silver, sulphate of copper, or alum, all in stick form. A conical tampon smeared with vaseline should then be introduced to prevent friction of the cauterized spot and contact with sound tissue.

Special indications for solid applications.—Although the affections in which solid substances are best applied to the cervix and vagina have been cursorily referred to in the preceding pages, it may be well to specify more clearly the precise conditions in which they alone are beneficial or are preferable to the same agents in solution.

The strong caustics or escharotics, such as caustic potash, chloride of zinc, and chromic acid are used only in malignant disease of the cervix or vagina, when it is desired to destroy the diseased tissue to its very core. The caustic potash and chloride of zinc are used in stick or pencils, which are bored to the desired depth into the diseased tissue near the sound border, and allowed to melt there. The action of these powerful escharotics should be confined to the growth by protecting the sound parts with oil or lard on cotton, or by cotton soaked in a solution of bicarbonate of soda. Chromic acid, not being deliquescent like potash, does not require to be so carefully watched against spreading ; the crystals are simply scattered on the diseased surface and soon combine with the secretions and form a dry eschar, which must be prevented from touching adjacent parts by cotton smeared with vaseline, or soaked in a solution of bicarbonate of soda. As a rule it is more convenient to employ a saturated solution of chromic acid, which can be applied with an applicator or stick wherever desired. The nitrate of silver, even in its stick form, is too superficial a caustic to be of any great avail in malignant disease; it will barely suffice in default of better. It has been *the* great remedy for all so-called "ulceration of the womb," and has done its full share of harm. I hardly know under what circumstances I should employ it, if I had one of the other equally efficient and (subsequently) less injurious caustics at hand. I shall refer later on to the dangers and limited uses of the solid lunar caustic. In obstinate papillary erosions of the cervix, the crystals of chromic acid may occasionally remove the indolent suppurating surface and set up healthy reparative action. The chloride of zinc is perhaps the most useful and reliable escharotic in malignant disease. But I believe I am not mistaken when I say that at present the extirpation of cervical or vaginal cancer by the unaided application of these powerful escharotics has been abandoned. Only after curette, knife, and scissors have paved the way and removed the bulk of the growth, is the escharotic (usually in solution) employed to dispose (so far as it can) of the remains of the enemy.

The *actual cautery* is used in the same class of cases as the strong escharotics, viz.: simple and papillary erosion, epithelioma and ulcerating carcinoma of the cervix; also in aggravated instances of chronic endocervicitis with eversion and hyperplasia of the lips. Formerly, it was customary to apply the hot iron to carcinoma of the cervix as a hemostatic without previous preparation ; the effect was always superficial, and the result generally very evanescent. Now, the diseased surface is thoroughly scraped, and as much pathological tissue removed as possible, before the heat is applied; the result is evidently vastly more lasting, especially if the iron be applied at red-heat, so as to extend below the surface, char the deeper parts, and produce a slough. Such applications either of heat or escharotics, require to be repeated at greater or lesser intervals in accordance with the rapidity of reproduction of the vascular malignant granulations, and should, as at first, be preceded by the sharp curette.

I have frequently applied the actual cautery in one form or another to malignant growths of the cervix uteri, with a view to arresting the hemorrhage and retarding the progress of the disease. While I have certainly succeeded in attaining the first object, I have failed quite as markedly in the second; indeed, it has seemed to me, almost, that the growth increased more rapidly after cauterization, and sprouted out into the peri-uterine cellular tissue, as though the heat stimulated cell proliferation. At all events, it appeared to me that the disease remained more stationary after the use of escharotics, and for a time at least was confined to the cervix. There can be no question that the deeper a slough is produced the more beneficial will the application be, and I think we get such a slough from the permanent application of a strong escharotic more certainly than from the actual cautery.

In erosion (simple or papillary) of the cervix, the actual cautery is an excellent application. Of course it should be applied less deeply than in malignant disease, since but a very superficial slough is desired.

It is of extreme importance that the degree to which the cautery is heated be carefully regulated; for a caustic escharotic effect, when a deep slough and wide-spreading reaction is desired, the red or even white heat is required; but when a styptic or merely astringent action is intended, the iron should be at black heat only.

There are three varieties of apparatus by which the actual cautery may be applied: the old-fashioned cautery irons of different shapes and patterns, the galvano-cautery, and the thermo-cautery of Paquelin. A very simple and mild thermic effect may be produced by applying the melted end of a stick of sealing-wax to the diseased surface; for want of better, this expedient may be used in simple erosion of the cervix. The cautery irons are of different shapes and sizes, according to the extent of the surface to be touched; thus we have them with a round flat tip, or button, an olive, or a slender point, the button and olive being the most common.

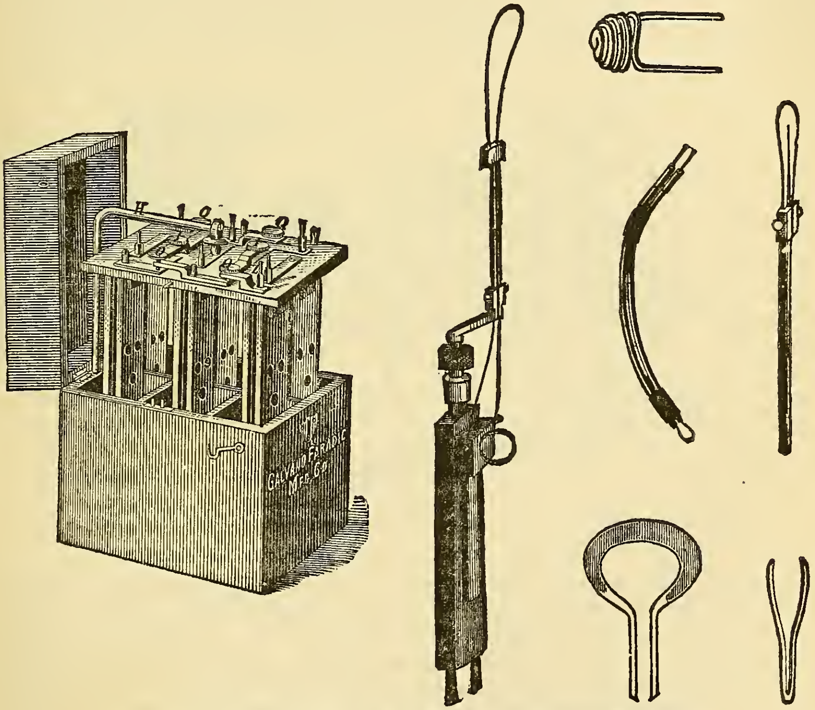


Fig. 118.—Galvano-cautery battery of Piffard, and cautery instruments.

The iron is fastened in a convenient handle of wood. These irons are heated by simple immersion in a fire or flame. The metal of the cautery tips in the galvano-cautery apparatus is platinum, the shape of the tip being generally that of a spiral cone of wire, although a knife-shaped tip is used when a portion of tissue is to be removed. The thermo-cautery apparatus of Paquelin is a recent invention, and has rapidly grown in favor for short operations, almost supplanting the galvano-cautery by its portability and convenience. It consists of a tip of platinum (of various shapes) which is heated by a flame of benzine blown upon it from the handle, by means of a rubber balloon and tube attached to it. The button-shaped tip is the one ordinarily used to cauterize a flat or hollow surface; the pointed tips to perforate deep-seated abscesses in the broad ligament, or cauterize the cervical canal, the knife to remove a portion or the whole of the cervix, etc. The platinum tip requires to be heated to a red heat in a spirit-lamp, while the benzine flame is blown upon it until it ignites. The compression of the rubber bulb keeps the platinum at the required degree of heat. For the purpose of protecting the neighboring parts from the radiating heat, in long operations on the cervix, chiefly amputation, a very ingenious contrivance has recently been devised by Dr. H. P. C. Wilson, of Baltimore, which consists of a hollow metal shield for the cautery shaft and tip, through which shield a current of cold water is kept running by means of an Eguisier's irrigator at one end, and an exit-tube at the other. The accompanying cuts give a good representation of the "antithermic shield," as its inventor calls it, and its attachment to the cautery. In long operations which must be performed through Sims' speculum, this protective is indispensable; for mere styptic or escharotic applications of the cautery, which may be made through any form of speculum which exposes the diseased part, no such addition is needed. I have always used the Sims speculum; but a large tubular speculum, or a widely expanded bivalve, will answer very well when only a momentary caustic application is intended. Tubes of horn have been constructed for this purpose, but the hard rubber is almost as good a non-conductor of heat; when the application is momentary, however, an ordinary glass tube will do, since the application is too short to crack the glass.

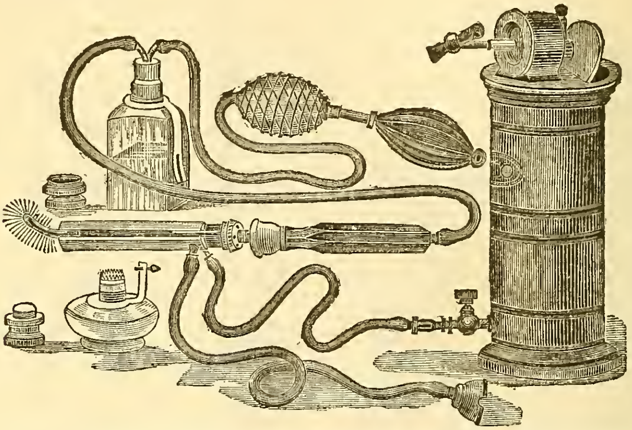


FIG. 119.—Paquelin's thermo-cautery apparatus with Wilson's antithermic shield.

After the application of the cautery to the cervix, a cleansing injection should be made through the speculum to remove all débris, but no tampons are necessary. The cautery is attended by so little pain, and is so rapid, that it is unnecessary, for that reason alone, to give an anesthetic. It is only when the patient is very timorous or restless, and the preparations inevitable to the starting of the cautery (heating of the irons, connection of the current, heating of the tip and blowing of the benzine flame), or the hissing noise produced by the contact of the cautery with the flesh, frighten her, that it is advisable to anesthetize her. The dangers of the operation may be considered *nil;* I have never known of an unfavorable reaction to the styptic or escharotic application of the actual cautery. Generally it is not necessary to confine the patient to her bed; if she is so confined for twenty-four hours or longer, it is not because of the cautery, but of the curetting or other operation which preceded the cautery. After the removal of tissue by the cautery, as amputation of the cervix, secondary hemorrhage may occur when the slough separates, and prove even fatal; the employment of a dull, scarcely red heat, and a very slow operation, will generally obviate this danger. Its further consideration is beyond my present plan.

The after-treatment of a cauterized cervix consists in tepid, mildly disinfectant injections until the slough separates (once or twice daily, care being taken to insert the nozzle of the syringe only just within the vaginal orifice, in order not to accidentally disturb the slough), and later in mildly astringent injections (sulphate or chloride of zinc, alum, etc.) until the surface has cicatrized over and all discharge ceased.

Precautions.—In applying the solid stick of nitrate of silver to the cervix, it should be borne in mind that its thorough or too frequent use is almost invariably followed by cicatricial contraction of the external os and cicatricial toughening of the mucous membrane covering the cervix. The stick of nitrate of silver should, therefore, be employed only in cases where the external os is patulous and abnormally large, where, indeed, its contraction is desired; in all cases with normal or small os the milder solutions of the nitrate are to be preferred; indeed, the stick should never be used until the solutions have failed, and even then the superficial application of nitric acid, as hereafter to be described, is advisable before resorting to the solid silver-nitrate. This fear of cicatricial contraction following the stick may be exaggerated; but competent observers support my experience that many a utero-ovarian neuralgia, with consequent general malnutrition, many a dysmenorrhea and sterility, has been produced solely by the inclusion of nerve-filaments in, and the stenosis of the external os by the cicatricial tissue of solid nitrate of silver applications to the cervix for "ulceration of the womb." The modern gynecologist of experience has learned to use the silver stick to the cervix only when he wants cicatrix and contraction; and even then he finds that contraction is much more easily procurable by paring the edges of the os and uniting them by sutures. The formation of cicatricial tissue on the cervix he avoids, for he knows that it may prove the source of local and general trouble, even though it may not, except in aggravated cases, produce such marked general anemia as Emmet claims. I can frankly say that, while I always carry the stick of nitrate of silver in a long vaginal porte-caustique in my gynecological satchel, I do not recollect using it for several years, except in one case of chancroid of the cervix, in the absence of nitric acid which I subsequently applied. So beneficial and indispensable as are the solutions of different strength of the nitrate silver in the treatment of inflammatory, desquamative, and ulcerative affections of cervix and vagina, so injurious and reprehensible is the solid stick. It was the sheet-anchor of the gynecologist of the past, and it has done vastly more harm than good. The substitution of a dense cicatricial surface for a soft, granulating, secreting erosion is but a poor exchange; the bad effects are generally not felt until long after the patient has been discharged "cured."

A word of caution should also be spoken against the use of chromic acid in crystals or strong solution. In some persons of unusual susceptibility it is very rapidly absorbed and produces unpleasant nervous shock, vomiting, and diarrhea. I recently met with such an effect in a case of carcinoma of the cervix, to which I applied a saturated solution of chromic acid after scraping away the bleeding granulations with the curette. The peculiar dry, burning sensation in the fauces was experienced in less than ten minutes, the shock and collapse, vomiting and diarrhea soon followed, and for several days the patient was severely ill. The application should, therefore, be superficial, and all excess of acid be at once removed.

β. *Fluids.*

The *medicinal agents* which are employed in a fluid form, either in their natural chemical state or in solutions of various strength, to the cervix and vagina are: *Escharotics:* Nitric acid, chromic acid, bromine, acid nitrate of mercury, saturated solution of chloride of zinc. *Caustics:* Nitrate of silver, carbolic acid, iodized phenol (carbolic acid and tincture iodine, equal parts), pyroligneous and acetic acid. *Astringents and styptics:* Tincture of chloride of iron, Monsel's solution of the persulphate of iron, solution of tannin in glycerine, solution of bismuth in glycerine, decoctions of oak and willow bark (all containing tannin), fluid extract of pinus and hydrastis canadensis, and of eucalyptus globulus, strong solution of alum, acetate of lead, of sulphate of zinc or copper, saturated solution of resin in alcohol (James' styptic), simple vinegar. *Alteratives:* Tincture of iodine, solution of iodide of potash, solution of iodoform in glycerine, cantharidal collodion. *Hydragogue:* Glycerine. *Emollients:* Oil of olives or poppies. *Narcotics:* Tincture of opium, belladonna, conium, or hyoscyamus, solution of hydrate of chloral, saturated solution of the bromides of potash, ammonium or sodium. *Disinfectants:* Carbolic acid, boracic acid, chlorinated soda, thymol.

Manner of Using and Special Indications.

According to the effect desired these agents are left in contact with the diseased surface for a shorter or longer period. As a rule, powerful substances, like the escharotics, then, agents which act instantaneously like caustics, and the effect of which is not increased by longer contact, are only applied for an instant, and then removed or their excess neutralized. Astringents, styptics, emollients, especially alteratives, hydragogues, and narcotics, on the other hand, require to remain in contact with the part for a period varying from several minutes to twenty-four hours, in order to exert their full effect. These latter, therefore, are best applied on a convenient vehicle, which, in gynecological practice, is represented by a pad or roll or ball of cotton, known under the name of tampon, the varieties, uses, and indications of which will be described at length in the chapter on Tamponade of the Vagina.

Fluids may be applied through either of the three varieties of specula, but it is for this purpose that the tubular speculum may be said to offer special advantages, and for this only. I have for years employed the tubular speculum solely for the purpose of applying fluids to the vagina, using the bivalve and Sims for that purpose only in the case of applications of tincture of iodine to the vaginal vault. Ointment and powders, when conveyed on the surface of tampons, can be equally well applied through either of the three specula. Strong fluid escharotics are best applied to the cervix through a cylinder, if the cervix be not too large to enter the speculum, or the vagina too small to admit a sufficiently large tube, for the reason that the escharotic is less liable to touch the sound tissue than if applied through a speculum which exposes the vagina also ; this is particularly true of a diffusible escharotic like caustic potash. However, as will be described hereafter, it is easy to protect the sound tissues by covering them with cotton ; and I am in the habit of applying escharotics to the cervix through the Sims when I have an assistant to hold the speculum.

In order that I may cover the subject completely, and that no point of practical importance be overlooked, I will proceed to describe, in detail, the application of each of the fluid agents above named, even at the risk of occasional repetition. In default of practical experience in these minute technicalities, the only means of affording the practitioner the opportunity to become acquainted with them, and to avoid annoyance to himself and pain to the patient, is to give him a description so minute as to enable him to see, in his mind's eye, every step of the various methods employed in minor gynecological therapeutics.

This must be my excuse, if at times in these pages I have seemed prolix and trivial. Only the practitioner who has been obliged to discover these little devices and "knacks and dodges," one by one, at the expense of time and annoyance to himself and discomfort to the patient, will appreciate that they are by no means trivial or unimportant to the successful practice of gynecology. A physician who has once burned the labia of a patient with iodine, or worse yet, with carbolic or nitric acid, because he had not learned the precise manner by which to avoid such an accident (and such knowledge does not come by intuition) will realize how necessary it is to know even the most trifling points in these matters.

Escharotics.—Of these agents the nitric acid is undoubtedly the one most commonly used. They are all applied to the cervix alone, to the vagina only when the same condition exists there which called for their application to the cervix, viz., malignant disease (epithelioma).

Venereal warts on the cervix or in the vagina, so-called "acute condylomata," should be touched with fuming nitric or saturated solution of chromic acid, which will cause them to shrivel. In this connection, I may state that Dr. Piffard, of New York, reports the speedy disappearance of these growths under the combined local and constitutional use of fluid extract of thuya occidentalis (tamarack) ; the warts are painted every day with the pure fluid extract, a wash or injection of the same, one drachm to the pint, is ordered, which is also to be applied on cloths continually if the warts are external, and twenty drops of the extract are given internally *ter die.*

A saturated solution of chromic acid in water (or it may be diluted as appears advisable), a solution of bromine in alcohol 1 : 5 or 10, a saturated solution of the pernitrate of mercury, are generally employed in malignant disease only. Formerly the solution of the nitrate of mercury was much used by gynecologists in the treatment of so-called "ulceration of the neck of the womb ;" but since we have learned through Emmet that that "ulceration" is in the large majority of cases due to the eversion of the mucous membrane of the cervix through an unhealed puerperal laceration of that part, the red everted cervical mucosa simulating an ulcer, we have recognized that the conversion of the normal or merely hyperplastic and slightly eroded mucous surface into a dense cicatrix is not the proper way of healing this affection ; and the progressive part of the profession have ceased applying strong escharotics to these cases except in unusual hyperplasia of the cervix. In the comparatively rare cases of superficial epithelial erosion of the cervix, especially if associated with papillary or follicular hypertrophy, the pernitrate or chromic acid solution may be used with advantage ; but generally the pure nitric acid will suffice, and it will often do good in superficial epithelial cancer of the cervix. The superficial, merely astringent, application of strong nitric acid to the hyperplastic, suppurating everted mucous membrane of a lacerated cervix will often do great good by constricting the tissues and preparing them for the operation of tracheloplasty.

The strong escharotics must be applied only at certain intervals, varying in accordance with the rapidity of separation of the slough and the necessity for a repetition of the cauterization ; generally not oftener than once, or at most, twice a month. If applied only superficially with a stick, nitric acid may be repeated every week until improvement ensues ; but if the application be so deep as to produce a slough, the same rule applies as to the other escharotics. If the escharotic (which in such cases should be only the nitric or dilute chromic acids) is applied to a superficial ulceration of the cervix, it is desirable to avoid the formation of a deep slough and consequent cicatricial tissue ; such applications should, therefore, be merely momentary, be made with an absorbent substance, as a wooden stick, and should not be repeated oftener than once or twice at intervals of two to four weeks. When, on the other hand, it is intended to destroy as much of the cervix as possible (*e.g.*, in malignant disease), the applications of the escharotic should be not only thorough and long continued, with an excess of the agent, but repeated as soon as the slightest evidence of the return of the disease shows itself. The strength, frequency, and thoroughness of these applications must, as in every therapeutical measure, be regulated by the peculiarities and exigencies of each individual case, and can be learned only by experience.

If the cervix or diseased part of it, or the vagina, can be conveniently exposed through the cylindrical speculum, this is unquestionably the most convenient method of applying the escharotic. A stick of hard rubber, twelve inches in length, and with a screw-spiral at its smaller end (see Fig. 116), is a convenient instrument for all fluid applications. A bit of absorbent cotton is tightly wrapped about the screw end (in case of an escharotic *very* tightly so as not to absorb too much fluid; in milder agents only tightly enough to prevent its slipping off) and dipped into the fluid; when sufficient has been taken up it is carried through the speculum against the cervix and the whole diseased surface thoroughly mopped with it. If the surface bleeds very readily, the stick should merely be pressed against it, not rapidly moved, so as not to excite hemorrhage. Every nook and crevice of the diseased surface should be thoroughly touched and the stick passed as far up into the cervical canal as may appear desirable, in any case stopping short of the internal os, unless the special indication exists for the cauterization of the uterine cavity, which procedure requires other preparations and will be discussed later on. If it appears necessary, the stick may be dipped again into the fluid and the cauterization repeated, until a sufficiently deep eschar seems to have been formed. All excess of fluid should then be mopped up on absorbent cotton carried in by long uterine dressing forceps. If a very thorough effect is desired it is best not to neutralize the excess of fluid by an alkaline solution (as chloride of sodium); if the effect is to be but superficial, as should always be the case in simple erosion of the cervix, such neutralization is always indicated, and can be obtained by introducing a solution of chloride of sodium or simple water into the speculum by a syringe, or on cotton, by forceps; the excess of water is caught in a cup as it flows out of the speculum. It should be well understood that when such a superficial effect only is desired, the escharotic should not be conveyed on a cotton-wrapped stick, but on an absorbent wooden stick which takes up all excess of the fluid (such as a match held in the dressing-forceps). When the cauterized surface has been wiped dry, a tampon, covered with vaseline or sweet-oil or common lard, is introduced through the speculum and held gently but firmly against the cervix with the closed dressing-forceps, while the speculum is rotated and withdrawn. This tampon is to be removed by the string attached to it in twenty-four hours, and tepid injections, perhaps with the addition of carbolic acid (one per cent.), made once or twice a day until the slough separates. A specular examination, made at intervals of three to four days, will disclose this occurrence, which generally calls for the occasional application of some mild caustic or astringent solution (as solution of nitrate silver, zinc. sulph., or tannin and water or glycerine) as hereafter to be described, until the surface has completely healed over. These rules apply equally to a malignant ulceration, in which only temporary relief is expected, and to superficial erosion in which a complete and permanent cure is aimed at. Of all these agents the pure nitric acid and the saturated solution of the chloride of zinc, while the most sure and efficacious, are at the same time the least injurious.

For, it should be remembered, that the toxic effects of two of these remedies, the chromic acid and the pernitrate of mercury, may not be confined to the local destruction of the diseased tissue: the chromium and the mercury may be absorbed and produce severe constitutional symptoms; the chromium, collapse, vomiting, and purging; the mercury, salivation. Care should therefore be taken not to continue the application of these two agents too long or too thoroughly, and to remove all excess as soon as the cauterization is accomplished. While the chloride of zinc acts best if applied on wads of cotton soaked in the solution (saturated or equal parts) squeezed dry and kept in apposition to the diseased surface for three to four days, the chromic acid, bromine, and mercury are best applied merely as above directed, the excess neutralized and the spread prevented by oiled tampons. The chloride of zinc is generally applied on cotton wads, as just described, after the curetting or excision of cancerous tissue from the cervix uteri. The wads must be squeezed thoroughly dry, and are packed tightly with the forceps into the cavity left by the excised growth. To prevent any possible oozing on and cauterization of sound tissue, the vagina is previously sponged out with a solution of bicarbonate of soda (℥ ss. to ℥ ij.) and subsequently filled with tampons soaked in this solution. In this manner all excess of the zinc-chloride is neutralized.

The danger of leaving the strong chromic acid solution in prolonged contact with the diseased surface in this manner, has already been illustrated while speaking of the application of solid substances to the cervix. The slough from these escharotics generally separates in a week; that of chloride of zinc, chromic acid, and bromine is dry, that of nitric acid usually soft and moist. No effort should be made to detach the slough by force, other than such as the vaginal injections exert.

A possible danger during the separation of the slough of an escharotic should be mentioned, viz., the chance arrosion of a blood-vessel and severe hemorrhage. Directions should therefore be left with the attendants, in case such a hemorrhage should suddenly occur (such as introduction of cotton, pressing an abundance of cotton against the vulva, keeping the thighs together, elevated hips, low head, etc.), and its possibility be provided for by the physician. Such hemorrhages may at times be very profuse, especially if the escharotic has been carried up into the cervical canal. The solid or pulverized agents are more liable to be followed by deep sloughing and hemorrhage than fluids.

The directions given above apply equally to the use of the fluid escharotics through a bivalve or Sims' speculum. But additional precautions should be observed to protect the sound parts from the caustic by packing cotton, best soaked in solution of bicarbonate of soda and squeezed dry, underneath the cervix so as to catch any fluid which may flow from the diseased surface. Or, the cotton may be soaked in sweet-oil or covered with lard. This cotton is snugly packed under the cervix with dressing-forceps. If the escharotic is applied on an absorbent wooden stick, it is generally unnecessary to thus protect the sound parts.

At the present day our knowledge of the benefit to be derived by scraping away the exuberant cancerous granulations with a sharp scoop, and of our inability to safely destroy the whole disease by even the most powerful escharotics, renders it unnecessary to use agents which will produce sloughs the extent of which cannot be foreseen. The use of the acid pernitrate of mercury and the caustic potash in cancer of the cervix uteri has therefore been abandoned by the majority of gynecologists, and only those escharotics, like the chloride of zinc, bromine, chromic and nitric acids have been retained, the effect of which can be better estimated and controlled.

Caustics; Astringents and Styptics; Alteratives; Hydragogue; Emollients; Narcotics.

I have grouped all these classes of fluid remedial agents together because, being milder in their character, they are all introduced against the cervix or vagina in very much the same manner, viz., by being poured into a cylindrical speculum or applied on cotton tampons left *in situ* for several hours or longer.

For the application of fluids of milder character, the cylindrical speculum is *the* instrument. Not only that it permits the touching of the cervix, for this can be done equally well and safely through the bivalve and Sims, but chiefly because its tubular form allows the fluid to be introduced more conveniently and brought in contact with every portion of the vaginal surface, by simply pouring a sufficient quantity into the speculum and successively bathing the whole canal in the fluid. This is done by gently rotating and withdrawing the speculum while a cotton-wrapped stick distributes the agent against every portion of the vaginal mucous membrane until the speculum is almost withdrawn from the vagina. The tube is then gently reintroduced up to the cervix, and the fluid contained in it emptied into a cup by gently depressing the mouth of the speculum. A tampon soaked in glycerine, or smeared with vaseline or some other emollient, is then introduced nearly to the cervix and the speculum withdrawn. If it is desirable to cover the tampon with a medicinal substance, such as an astringent powder or solution, in addition to the agent introduced by the speculum, the tampon can be introduced quite as well through the tube as through a Sims or bivalve. Or the powder may be sprinkled into the tube and retained by a tampon, as already described.

Some of the stronger fluid caustics and astringents are not generally poured into the speculum as described, but being used chiefly as applications to the cervix are applied directly to the diseased spot by a cotton-wrapped stick; these are pure carbolic acid, iodized phenol, pyroligneous and acetic acids, pure tincture of chloride of iron, and solution of persulphate of iron, saturated solution of alum, and copper and zinc sulphate. Others again, being intended to remain long in contact with the part for which they are specially designed, are applied on the end of or in the substance of cotton tampons; such are the majority of the other agents mentioned in the list. Generally, however, the fluid is first brought in contact with the vaginal interior by being poured into the speculum (which doubtless is the more effectual method) and the effect assured by introducing a tampon saturated in the same fluid. These tampons are allowed to remain from twelve to twenty-four hours, and their removal is generally followed by the cleansing of the vagina by some mild astringent injection or by the hot vaginal bath, as already described. The repetition of these applications depends entirely upon the gravity of the case and the judgment of the physician. The average frequency will be stated under each separate agent.

Caustics.—I have already stated that four of the five caustics included in my list, viz., pure carbolic and acetic acid, the iodized phenol, and pyroligneous acid, are too powerful to be applied indiscriminately to the cervix and vagina, and that their use is limited to conditions of certain portions of these organs in which a positive caustic effect is desired; to these parts the caustic is applied by means of a cotton-wrapped stick, and the excess at once removed, as prescribed for escharotics.

The *indications* for these strong caustics are chiefly erosions of the cervix and lips of the external os, in which the papillæ and areolar tissue are more or less hyperplastic, the blood-vessels dilated, and the reparative power impaired. The stimulus of these active agents sets up fresh reparative action after the separation of the superficial slough, and this process is assisted by the subsequent local employment of mild astringent solutions. The condition thus described is most commonly met with in lacerated cervices with everted lips, and the treatment is then less curative than preparatory to the plastic operation. These strong caustics should not, as a rule, be applied oftener than once, rarely twice a week. In the interval, local astringents (to be described hereafter) may be used through the speculum, and mildly astringent injections should always be advised. Milder solutions of these caustic fluids are not generally used, except of the carbolic acid, which is so popularly employed in very dilute condition as vaginal injection. The acetic and pyroligneous acids, and the iodized phenol owe their chief utility to their powerful caustic effect, and this is manifest only when the agent is applied pure or in a highly concentrated state. Strongly diluted, the effect would be no better and no worse than ordinary carbolic or vinegar injections. Each of these agents has its advocates, who prefer it to all others. I, for my part, have found the iodized phenol to act more efficiently and kindly than the others, and therefore use it almost exclusively as a caustic to an eroded cervix where the nitrate of silver solution is counter-indicated or fails.

I have thus far omitted to include the nitrate of silver in the discussion of strong caustics, because I wish to devote a separate paragraph to this, in my opinion, most valuable of all true caustics, astringents, and antiphlogistics. While the caustics already mentioned are beneficial only when applied pure, and are, as a rule, available only when a limited space is to be cauterized, the nitrate of silver exerts its most beneficial effect in gynecological practice chiefly when used in comparatively mild solutions, and applied to the whole cervix, vagina, or vulva. I have already expressed my opinion of the solid stick as an application to the cervix. A saturated solution would not be much better. But solutions ranging from one drachm to ten grains to the ounce have a utility and an influence peculiarly their own, which is possessed and exerted to a like degree by no other caustic or astringent.

In acute or subacute vaginitis, chiefly if of venereal origin or in intensity resembling that disease, with highly congested mucous membrane of vagina and vulva and a greenish yellow, pungent discharge, I know of no application which will so soon allay the hyperemia and control the secretion as a solution of the nitrate of silver of the strength of thirty grains to the ounce. The erosion of the cervix, so commonly met with in these cases, if they have existed longer than a few days, is treated and cured by a solution of forty to sixty grains to the ounce.

Be it well understood that not every such acute or subacute vulvo-vaginitis with highly congested mucous membrane and purulent discharge, is due to venereal infection. I have seen severe instances of the kind in virgins, who besides were entirely above suspicion. On exposure to cold during menstruation, an overexertion may bring on an acrid uterine discharge, which erodes the lips of the os exactly as the upper lip is eroded by a discharge from the nostril during a violent coryza, and this discharge, as it flows toward the vulva, infects in turn each portion of the vaginal tract, and finally the vulvar surface. A positive diagnosis of gonorrheal vaginitis must usually be made more on the strength of the antecedents and character of the patient, and on the admitted or suspected possibility of such an occurrence, than on the physical appearances. Thus, recently a woman presented herself to me for a profuse leucorrhea, which she said had existed for about three weeks. I found an acute vaginitis of the most virulent type, with a profuse, offensive greenish discharge, which in its intensity so much resembled gonorrhea that I could not repress my conviction that it really was such. The patient was a respectable married woman, and disclaimed with perfect ingenuousness any knowledge of the cause of this discharge. Incidentally she mentioned that her husband had been away six months and had only returned three weeks ago, shortly before the discharge appeared. The coincidence between his return and the vaginal discharge I am convinced was not accidental, and the etiology of the unquestionable gonorrhea was revealed.

After this digression, which seems to me not out of place in a discussion on the treatment of vulvo-vaginitis, I will describe the manner in which I am in the habit of applying the solutions of nitrate of silver of various strengths to the cervix and vagina. If the speculum (either variety) reveals an erosion of the cervix, I touch the abraded spot gently but thoroughly with a cotton-wrapped stick dipped in a silver solution of ʒ j. to ℥ j. If there is no vaginitis present, I simply dry the cervix with cotton held in the dressing-forceps, and push a tampon covered with vaseline up to the cervix and withdraw the speculum. The whitening of the cauterized surface through the formation of an albuminate of silver is a proof of the disintegration or desquamation of the epithelium. A perfectly healthy mucous surface with a sound epithelial covering remains unchanged by the application of a mild solution of nitrate of silver. This white color thus shows the extent and degree of the inflammation. If, however, the vagina is congested and inflamed, especially if the epithelium appears swollen or abraded, I follow the application to the cervix by pouring about a teaspoonful of silver solution of ʒ j. to ℥ j. into the speculum, and then gently withdrawing the tube, I swab the vaginal walls, as they successively become exposed, with the solution, until the speculum is almost out of the vagina. By then depressing its funnel-shaped mouth the fluid is made to flow out into a cup, and any excess of the caustic thus removed. The speculum is then reintroduced almost to the cervix, and a conical tampon thoroughly covered with vaseline inserted, and the speculum removed. It is always well to protect the clothing of the patient from stains of the silver by packing cotton-wool between the nates and against the perineum, which will absorb the almost unavoidable oozing of a few drops from the vagina when the speculum is withdrawn.

If the vulva and vaginal orifice are also inflamed and abraded, as is usually the case when the discharge is acrid, these parts are gently painted with a silver solution of gr. x. to ℥ j., and a strip of cotton-batting smeared with vaseline is placed between the nymphæ and pressed into the vaginal orifice. This last strip is removed by the patient at the next micturition, the vaginal tampon not until twelve to eighteen hours later; mild astringent vaginal injections are then made two or three or more times daily, until the repetition of the silver process in three to six days. In aggravated cases the silver is applied every other day, each alternate application being of a milder solution, say, gr. xv. to gr. xx. instead of ʒ ss. to the ounce. If a few weeks of this treatment do not show marked improvement, it is necessary to try some other agent to the cervix, and the best is then undoubtedly the fuming nitric acid superficially applied by a wooden stick. The iodized phenol and sat. sol. chromic acid may have a trial also, if the nitric fails; and it certainly must be an obstinate erosion which resists all these remedies perseveringly applied. When the erosion is that of an everted cervical mucous membrane, however, nothing but the repair of the laceration by operation will fully cure the case. It is rare that a vaginitis does not yield to the silver solution, if it is applied with sufficient frequency and perseverance; the relaxed condition of the vaginal mucous membrane usually following the acute stage requires other remedies, however, and here the astringents to be mentioned in the next section come into play. Should the silver, contrary to expectation, fail, the alum or zinc or copper solutions (ʒ ss. to ʒ j. to ℥ j.), or tannin in powder or in saturated solution in water or glycerine, or dilute solution of tincture of chloride of iron (ʒ j. to ℥ iv.), or the pure fluid extract of hydrastis canadensis or eucalyptus globulus, painted all over the cervix and vagina, may effect a cure. The greased tampon and cotton strip described above are used for the purpose of preventing friction of the freshly cauterized surfaces and probable abrasion of the epithelium; this precaution should never be neglected.

In very virulent vaginitis, especially if of specific origin or characterized by distinct enlargement of the papillæ (so-called "granular" vaginitis), it is often difficult to cure the disease because certain portions of the vaginal tract are not reached by the caustic; small crevices between the rugæ escape uncauterized and form the foci for a renewal of the infection. This is due to a want of sufficient dilatation of the canal so as to efface these inequalities, and may be overcome to a certain extent by using a large speculum. But this is often not practicable if the vaginal orifice is small, and if the canal is very large and rugous even the largest speculum in use will not distend its walls to their utmost. To obtain this desired distention and inspection of the vaginal canal a very excellent plan has been hit upon by Dr. Palmer of Louisville. He places the woman in the knee-breast position, elevates the perineum with the Sims, and then finds the vagina expanded like a balloon, with every wrinkle and fold effaced. By now swabbing its walls with the caustic he is absolutely certain that no spot, be it never so minute, escapes. The excess can be mopped out or drawn up by a syringe, and the tampon is then introduced with the forceps, and the Sims removed. I have found this method excellent in cases where the ordinary plan through the tubular speculum had failed. It can also be employed with any of the fluid astringents, which may be poured into the expanded vagina until it is filled to the brim and retained there so long as the patient can endure the uncomfortable position. A very powerful astringent effect can evidently be exerted on the vaginal walls in this manner, which may prove beneficial in relaxation and more or less complete prolapse (rectocele, cystocele) of that organ.

Astringents and styptics.—I have already stated that certain of the stronger agents of this class are merely painted on the diseased part through a speculum; the excess is then removed and an astringent or emollient tampon introduced. If a styptic or particularly strong astringent effect is desired, the part of the tampon to be placed in apposition to the diseased surface is soaked in the agent. These applications may be made through either form of speculum which best exposes the part to be treated. The tr. ferri perchlor. and the liq. ferri persulphatis may be applied pure or mixed with a proportion of glycerine varying with the intensity of effect desired. A solution of bismuth in glycerine (it should be made of the thickness of cream) is applied to the cervix on absorbent cotton, and is particularly recommended for "ulceration" (I suppose erosion is meant) by Dr. Suesseroth, of Chambersburg, Pa. A saturated solution of resin in alcohol (known as James' styptic) is used chiefly in cases of hemorrhage from carcinoma of the cervix. It is applied on cotton firmly pressed against the bleeding surface until the alcohol evaporates and leaves the tenacious resinous coating as a hemostatic, and this cotton is then retained by a dry tampon. It may not need renewal at all, or a recurrence of the hemorrhage may call for a fresh application at any time. The dry tampons should in every case be removed in twenty-four hours, the styptic cotton not until it has of itself become detached.

Dry styptic cotton can be easily prepared and kept on hand, by saturating the cotton with a solution of the perchloride or persulphate of iron (the strength of the solution varying with the effect desired: styptic, equal parts, or stronger; astringent, one tablespoonful to one-half pint or pint of water), expressing the excess, and drying it. This cotton can be applied either in small pledgets directly to the affected part, or in large tampons filling the whole vagina. Other astringents and styptics, such as tincture of iodine, alum, zinc, copper, tannin, can be prepared in the same manner and kept on hand for use; the solutions should be alcoholic or aqueous, for glycerine does not evaporate to desiccation.

Aside from the styptic effect which these agents all possess in a greater or lesser degree in accordance with the strength of the application, their chief utility in gynecological practice is as astringents. And the one great indication for the use of local astringent applications is a hypersecretion from the mucous membrane of the genital tract. This hypersecretion may be due to an acute hyperemia or inflammation, as in acute vaginitis or endometritis, or depend on a chronic relaxed and dilated condition of the blood-vessels and glands. In either case the choice of astringents will differ, the acute stage requiring first the application of caustics, as already described in the previous section, and the chronic condition calling for the persistent use of the various astringents enumerated in the list. These two stages may merge one into the other, the acute into the chronic or (more rarely) the reverse by renewed irritation, or the chronic leucorrhea may depend upon general debility and loss of tone. In the latter case the administration of general tonics will be required in addition to local astringents; either alone will prove insufficient.

The solution of tannic acid in glycerine or water is one of the most efficient astringents in use in gynecological practice. As a hemostatic the dry powder alone is preferable. When the astringent effect chiefly is desired, a solution of tannin in water (1 : 4 or 6) will act better than if glycerine be used as a vehicle; but, if the condition be an acute or subacute one and an antiphlogistic and emollient effect be intended, the solution in glycerine (equal proportions) should be used. If burning or pain be present, the addition of iodoform to the tannin and glycerine solution (iodoform ʒ ij. to ʒ iv. to tannin ℥ j.) will prove useful, the tannin masking to some extent the disagreeable odor of the iodoform. Or laudanum or tincture hyoscyami may be added to the application in proportions of ʒ i. to ℥ j. of mixture.

The best way of applying any of these astringents to the whole vaginal tract is to pour a teaspoonful or more of the mixture or fluid into the tubular speculum, and then bring each part of the vaginal wall in contact with the astringent by slowly withdrawing the speculum and swabbing the parts successively with a brush on a long handle or a cotton-wrapped stick. The excess may then be allowed to run out into a cup, or, if it be slight, is left in the vagina, and a conical tampon soaked either in pure glycerine or in the same solution is introduced, held fast by the dressing-forceps, and the speculum removed.

Thus the mixture of the tincture of the perchloride of iron and liquor ferri persulphatis with glycerine (equal parts, or weaker), the glycerole of tannin, the glycerole of bismuth (used on account of the supposed specific effect of bismuth on the hypersecretion of mucus), the decoctions of oak- and willow-bark, the fluid extracts of hydrastis and pinus canadensis and of eucalyptus, are applied to the vaginal mucous membrane. If the solution be a very strong one, it is generally best not to leave it in contact so long as would be the case if a tampon soaked in the same were introduced, but to apply instead a tampon soaked in a milder solution or in glycerine, or covered with vaseline. It is important that the cord attached to the tampon should be a stout one, since it might break in the attempt to remove the cotton from the contracted vagina and produce inconveniences to be described hereafter. If it be unnecessary to apply the astringent so thoroughly, or if a cylindrical speculum be not at hand, the astringent solution can be applied by soaking a tampon in it and introducing it through either of the three varieties of specula, leaving it *in situ* for at least twenty-four hours. Care should be taken that the excess of fluid be thoroughly expressed from the tampons before they are crowded into the speculum, in order to prevent the escape of the astringent from the mouth of the speculum and the soiling of the linen by such of them as stain (iron, tannin, oak-bark decoction, etc.).

These astringent applications should be repeated three times a week ; in very obstinate cases, or where remedies of only moderate strength can be employed, every day, until improvement is manifested. The addition of a narcotic (tr. opii, hyoscyami, or conii) to the astringent solution in which the tampon is soaked is always indicated when pain exists, or the application is likely to be followed by pain. The quantity of the narcotic need not be estimated to a nicety, as comparatively little is absorbed from the vagina; a teaspoonful of either of the three agents mentioned will ordinarily suffice for a tampon.

The fluid extracts of pinus canadensis and eucalyptus globulus may be used either pure or mixed with equal parts of glycerine. They are beneficial chiefly in cases of acute and subacute congestion of the cervix and vagina, as in papillary erosions, endocervicitis and cystic hyperplasia of a lacerated and everted cervix. The pure extract should be painted over the cervix and a tampon soaked in the glycerine solution then applied.

Pure vinegar has chiefly a styptic and disinfectant property; it can be used in default of something better for either of these objects; either through a speculum or on tampons.

It is a good rule, after using any local remedy for a reasonable length of time without appreciable benefit, either to interrupt it for a short time to give the *vis medicatrix naturæ* an opportunity to assert itself, or to change the remedy. An obstinate leucorrhea may require the whole list before the proper agent is found.

An old chronic leucorrhea of this character can, in my opinion, be cured only by the persevering and frequent local use of astringents, through a speculum, together with the hot vaginal bath, as already described. Simple astringent injections are utterly valueless in a curative sense; they merely keep the affection at a standstill, and insure cleanliness.

It is almost needless to say that if an endometritis exists, it must be treated in conjunction with the vaginal leucorrhea and, if possible, cured, before a permanent improvement can be expected in the latter.

Alteratives.—Iodine and its compounds are the only real alterative and absorbent agents which are directly applied to the cervix, always excepting the hot vaginal douche. The effect derived from these applications is on the one hand that of counter-irritation to the inflamed and congested cervix and vaginal mucous membrane, and of contraction of the capillaries; and on the other, that of stimulation of the lymphatics to absorb the hyperplastic tissue in areolar hyperplasia and the exudation of plastic lymph in pelvic peritonitis and cellulitis. It is, therefore, in areolar hyperplasia (or chronic subinvolution, for I believe deficient puerperal involution to be, at least, a frequent starting-point of true "areolar hyperplasia") of the whole uterus, or cervix alone, in subacute pelvic peritonitis and cellulitis, and in the so-called "chronic" forms of these latter affections of the pelvic peritoneum and cellular tissue, that we should use these local counter-irritants and alteratives, and may frequently expect material benefit from them. By the persistent application to the vaginal roof and cervix, once or twice a week for several months, of these agents, chiefly the pure tincture of iodine, I have seen most decided diminution in size of a hyperplastic uterus with marked amelioration of the various distressing hystero-neuroses so characteristic of this affection, and gradual softening and absorption of the exudation in not too old cases of pelvic peritonitis and cellulitis. I cannot say as much for the dispersion of old adhesions and callosities of the parametran tissue, which by their pressure on nerve-filaments and distortion of uterus and ovaries produce many of the annoying aches and pains complained of by the victims of "chronic pelvic peritonitis and cellulitis;" these really cicatricial tissues remain unaffected by all alteratives, and the most one can hope to do with these applications is to relieve any accidentally accompanying edema or intercurrent exacerbation of the old affection. This can usually be done, and I have therefore always felt myself justified in extending to the patients a prospect of relief, although small hope of a perfect cure. I have in course of time come to look upon the periodical and systematic use of alteratives to the cervix and vaginal cul-de-sac in these affections, as so beneficial, in conjunction with glycerine and hot injections, that I rarely treat a case of areolar hyperplasia or subacute or "chronic" pelvic peritonitis or cellulitis otherwise than by the application with a swab once or twice a week through the speculum of pure tincture of iodine to the cervix and vaginal vault, followed by a glycerine tampon, and always accompanied by the hot vaginal douche. If the iodine is used but once a week, on one or both of the remaining alternate days, I introduce a tampon soaked in a mixture of iodine and glycerine (equal parts), or iodoform and glycerine (1 : 10, with one drop of oil of peppermint or balsam of Peru added for each drachm, to correct the odor), and leave it *in situ* for twenty-four hours. By the persistent use of these remedies (by persistent I mean for from three to six months, and we should expressly caution the patients not to expect even the sign of an improvement sooner) we may confidently hope to relieve our patients at least, if we cannot actually cure them. As any relief is grateful in these distressing affections, of which the hyperplasia particularly exerts a most deleterious effect on the nervous system, even this prospect cheers the patient and is worthy of realization. The patient should, however, be warned that a cessation of the treatment after a merely temporary improvement will invariably entail a return of the symptoms and a recommencement of the treatment at the *status quo ante*.

A fresh cellulitis of only a few days' or a week's duration should not be treated by the local application of alterative drugs. So long as the exudation is markedly tender to the touch and the vaginal temperature elevated, hot injections and abdominal poultices, perhaps preceded by a blister, are the proper treatment. Only when all acute symptoms have subsided may the dispersion and absorption of the exudation be aided by remedies described in this section.

I have thus far spoken only of the tissues to which the alterative is directly applied. But of scarcely less value is their use in that still more harassing and even less curable affection (according to Thomas), subacute and chronic oöphoritis. The chronically congested and hyperesthetic ovary becomes in time hyperplastic, its stroma sclerifies (interstitial oöphoritis) and the constant wearing, dragging pain in the groin and back, makes life a burden to the sufferer and is the bugbear of the gynecologist. Often the ovary is imbedded in more or less fresh plastic exudation, the pressure of which causes flashes of pain to radiate all through the body. Now, while but little more than slight temporary relief can be afforded by the local application of alteratives and counter-irritants to the region of the ovary, abdominal or vaginal, when that organ has undergone sclerotic degeneration, there is no doubt, whatever, that much good may be done to the congested, subacutely inflamed organ, whether it be enclosed in plastic lymph or not, by the frequent systematic applications above mentioned. The employment of counter-irritation by blisters and iodine to the abdominal ovarian region is at the same time decidedly advisable. If an ovary is prolapsed, and therefore in close contiguity to the vaginal pouch, the application will be still more effective. I can honestly say that, both in hospital and private practice, I have many times relieved patients of their ovaralgia dependent on congestion and subacute inflammation of the organ, by the *frequent, persistent* use of the above remedies, and relieved them not only temporarily, but if they were as persevering as they were directed to be, permanently. I claim to cure these cases quite as little as I do a hyperplasia or cicatricial cellulitis, but I do know that they can be immensely and often permanently relieved in the manner indicated if their perseverance will only keep pace with that of their physician. Unfortunately, such cases soon tire of the routine, although the treatment is neither very painful nor distressing, and skip a few months after the first improvement only to return again and again. Those who have persevered have never had occasion to regret it.

I have spoken of the local influence of alteratives only in describing the effects to be obtained by their use. In the main, this may be considered the chief benefit, especially as regards the tincture of iodine; but there can be no doubt that it, and particularly the iodoform and iodide of potash are, to a certain extent, absorbed and act through the vascular system. But the power of absorption of the vaginal mucous membrane is vastly inferior to that of the endometrium or rectal mucosa.

The tincture of iodine may be applied in two ways: mixed with glycerine on a cotton tampon and left in the vagina for twenty-four hours, or pure against the cervix and vaginal pouch by a cotton-wrapped stick. The first method requires no other explanation than that it is done in the usual way, and that a second dry tampon should be placed over the first to prevent the escape of the fluid on the delicate vulva.

The application of the tincture of iodine on a cotton-wrapped stick may be made through a cylindrical, a bivalve, or a Sims speculum. Through a cylinder one cannot be quite sure that the iodine reaches the exact spot in the fornix vaginæ, or indeed the fornix at all; for the cervix fills up the lumen of the speculum and there is no room to crowd the stick with iodine beyond it; besides, by doing so the fluid would be squeezed out and flow down the speculum. Or the vaginal walls prolapse into the speculum and intervene between the applicator and the fornix. However, for painting the cervix alone, the cylindrical speculum answers very well. Through the bivalve the same objections hold good, perhaps to a lesser extent. But I, habitually using as I do the Sims, prefer it decidedly for this maneuvre also, and have no difficulty in executing it even without a nurse. An accident to be avoided in making this application is to bring the iodine in contact with the sensitive vaginal orifice and vulva, which may readily occur if the soaked swab is carelessly introduced or so freely saturated as to allow the excess of iodine to flow along the crease in the anterior wall and on the vestibule. While the iodine produces scarcely more than a slight smarting when applied to the mucous membrane of the vagina proper, it gives intense pain when it touches the thinner and more sensitive covering of the vulva, particularly the vestibule. And that this readily happens unless proper precautions are taken is at once apparent on considering the peculiar position occupied by the patient, and the downward incline of the vaginal canal from within outward. After introducing the Sims, and before making the application, it is well, therefore, to pack some absorbent cotton against the bulb of the urethra and vestibule as a protection to these parts, and what is even more important, the peculiar upward twist described on page 76 should be given to the speculum so as to place the point of the internal blade decidedly lower than the perineal angle of the speculum. In this manner the inclination of the vaginal canal is reversed, and fluids poured into it will flow inward and downward toward the fornix, instead of outward and downward as they ordinarily would in Sims' position. The cervix being thoroughly exposed, the cotton-wrapped end of the stick is dipped in the tincture of iodine (which, like all fluid applications it is well to keep in a wide-mouthed bottle) the excess squeezed out by gently pressing the cotton against the edge of the bottle, and carefully passed through the vaginal orifice up to the fornix. Whether it is the object to paint the cervix only or the whole fornix, it is advisable to be on the safe side and make the application as thorough as possible. I therefore generally swab the whole cervix and posterior fornix vaginæ until all of the fluid has been expressed from the cotton, thrusting the stick a number of times rapidly and gently against different parts of the fornix. To make the application thorough can do no harm, and it is evident that the greater the surface covered by the iodine in a case of old pelvic cellulitis the more efficient will the application be. After such an application the vaginal pouch and cervix are almost black in color, and the external os difficult to distinguish. It is therefore advisable to make any applications to the endometrium, which may also be required, previous to this swabbing. When the application is completed, the stick is removed with equal care in order not to touch the vulva, and any positive excess of fluid iodine wiped away by cotton on the dressing-forceps, which it is well to have at hand in case the fluid should accidentally flow toward the vulva in spite of all precautions. A tampon thoroughly soaked in glycerine and expressed is then introduced to the fornix by the dressing-forceps and the speculum removed. In removing the Sims after a tampon has been placed it may be as well to mention here a precaution, which will be referred to again, viz., to keep the point of the vaginal blade of the speculum backward, and the whole blade in close contact with the posterior wall until the instrument is entirely withdrawn. If the point of the vaginal blade is directed forward while being withdrawn, the tampon will be lifted out with it.

The glycerine tampon is removed on the next day and the usual hot vaginal injection made. It is scarcely necessary to tell the practitioner that an injection, hot or otherwise, is not to be used when a tampon is in the vagina; but it is by no means unnecessary to tell the patient so, since very few will consider the tampon an obstacle to the usual injection.

These iodine applications should be made at least once, in obstinate or aggravated cases twice a week, and even every other day for a short period. But so frequent applications are very liable, in conjunction with the softening effect and pressure of the tampon, to produce excoriation of the vaginal mucous membrane, which is usually not desirable, although in the cervix alone it may do good in areolar hyperplasia. For this reason, I rarely employ the strong Churchill's tincture of iodine for vaginal applications, having found that it excoriates too rapidly, and thereby obliges an intermission of the applications.

I have been thus explicit in describing the details of this maneuvre, because I have witnessed over and over again the blunders made by my students in the very points cautioned against above (and, indeed, have occasionally myself, when in haste, had the iodine flow on the vulva because I filled the swab too full or neglected the speculum twist or vestibular cotton), and was made disagreeably conscious of the sharp pain unnecessarily inflicted on the patients by the iodine touching the vulva. It is true, the pain lasts but a few minutes, and may be allayed by placing glycerine-soaked cotton between the labia ; but, we are so often obliged to inflict necessary pain on our patients during gynecological manipulations, that it is certainly desirable to avoid doing so unnecessarily whenever possible.

I have never seen any positive unpleasant consequences follow this profuse iodization of the vagina ; still, occasionally a patient complains at the next visit of having felt some abdominal pain or lost some blood after the last application, and it is best in such cases to make the application very mildly and gently, or substitute the iodoform tampon presently to be described, for one or two visits. At times it is well, as with every species of continuous local treatment in gynecology, to omit all direct applications for one or two weeks and give the patient locally and constitutionally a rest. Often the beneficial influence of the treatment is not experienced until that treatment with its necessary excitement has been discontinued.

The application of *iodoform* to the cervix and vagina in the shape of powder with and without tannin has already been discussed under *Solids ;* but a preferable method of employing it when an alterative and discutient effect is desired is through a speculum in the form of a solution in glycerine (1:10) with the addition of one drop of oil of peppermint to the drachm of fluid as a deodorant. This oil effectually disguises the peculiar and always recognizable odor of iodoform. But as the pungent odor of the peppermint is to some as disagreeable as the iodoform, the Peruvian balsam may be substituted in equal proportions. The balsam is said to correct the iodoform odor even better than the mint. This solution, after being well shaken, is applied to the cervix and upper portion of vagina by a cotton swab, and a tampon is then soaked in the liquid, expressed, and introduced, followed by a dry tampon to prevent the escape of the fluid from the vagina. This application may be repeated every other day, or even every day, the tampon always being retained for from eighteen to twenty-four hours. In the interval the usual hot injections. The iodoform tampon is not in the least painful; on the contrary, it has a soothing, gently narcotic effect, and is therefore indicated chiefly where dull pelvic pain exists, as in the exudation of old pelvic peritonitis and cellulitis, and chronic ovaritis. The alterative and absorbent qualities of the iodine will exert their influence also in this combination, and may even be of some benefit in areolar hyperplasia. The counter-irritant, stimulant effect of the tincture of iodine is not exerted by the iodoform. The solution of *iodide of potash* is applied on cotton tampons in the same manner as the iodoform. The solution may be in glycerine or water, or both together. The glycerine is preferable, and the strength should be from ʒ ss. to ʒ j. to the ounce. A stronger solution I have found to cause smarting. It is best prevented from oozing on the vulva by a dry tampon. The cotton should be retained for from eighteen to twenty-four hours, and be repeated every two or three days. In fact, the indications and treatment are precisely the same as when iodoform is used. If the application gives pain, a drachm of tincture of opium may be added to each tampon.

The same rule applies to these two remedies as has already been stated for the tincture of iodine, viz.: perseverance. With it much may be achieved in these intractable cases; without it, little or nothing.

The *cantharidal collodion* has been included under the head of Alteratives, because that is really the effect produced by blistering the cervix. It should be applied only to the cervix, never to the vagina, since adhesions between the two parts might otherwise take place. The indication is areolar hyperplasia, particularly the old, sclerotic variety, which refuses to yield to milder measures, and the object that of counter-irritation, depletion, and stimulation to absorption of the adventitious tissue. The collodion is applied with a brush through a cylindrical speculum only, the excess wiped up, and a glycerine tampon introduced. If vesication has not taken place on removal of the tampon after twenty-four hours, the application is repeated, and so on until a decided blister is raised; this is pricked, and daily glycerine tampons applied to increase the watery discharge from the uterine capillaries. When the blister has healed, the application may be repeated, and this treatment may be continued through many months. At the present day, blistering the cervix for hyperplasia is not fashionable, having been supplanted by operative measures, such as amputation ; but doubtless it is a beneficial remedy, and should not be neglected when the iodine and other applications mentioned have failed.

Hydragogue.—The only remedy of this class which we use in gynecology is glycerine. The introduction of this remedy into gynecological practice for the express purpose of producing and sustaining a free watery discharge from the hyperemic female genital organs dates, so far as I am aware, from the new era in gynecology inaugurated by J. Marion Sims. Since his time glycerine forms the inseparable companion of the gynecologist, and undoubtedly deserves the universal esteem in which it is held. Its indications are precisely identical with those which call for a local alterative, that is all acute, subacute, and chronic inflammatory or hyperemic conditions of the pelvic organs. As an auxiliary to these alteratives it is a specially valuable agent; and its use in conjunction with the systematic hot vaginal douche serves to mollify whatever local irritation the douche may produce, and to intensify its antiphlogistic effects. Almost every application to the cervix, vagina, or endometrium, is followed by the immediate introduction of a cotton tampon soaked in glycerine, which is retained for from eighteen to twenty-four hours and produces a profuse watery discharge. Of the prospective occurrence of this discharge the patients should be warned, partly that they may protect their clothing, and partly to avoid a belief on their part that the leucorrhea from which they were probably suffering has been increased by the treatment. The latter reason, it will be observed, is as much in the interest of the physician as of the patient.

Glycerine is applied to the vagina and cervix chiefly on tampons of cotton-wool, which have been soaked in the liquid and squeezed so as not to drip. The best mode of introducing these tampons is always through a speculum, because not only can a larger tampon be used, but the exact location of the plug regulated. Both these points are of importance, particularly the latter, as when it is desired to exert pressure against a particular spot, say behind the uterus in retrodisplacement of that organ or an enlarged ovary. The use of glycerine, to be really productive of benefit, should be even more systematic, frequent, and persistent than that of the alteratives in conjunction with which it is generally used. Glycerine tampons should therefore be introduced daily; if two hot injections per day are used, even twice daily after each injection. Manifestly, but few patients can afford to see a physician twice a day for months to have this done, and perhaps few physicians would care to be saddled with such routine work. A nurse may easily be taught this simple maneuvre, and I have frequently succeeded in accomplishing the object in this way. But comparatively few patients have trained nurses at their disposal; and it has therefore been sought to overcome the difficulty by constructing tubes with piston rods, into which the tampon is put and, the tube being introduced into the vagina by the patient herself, the tampon is expressed and the tube removed. The objection to these tubes is, 1, that their calibre is necessarily so small (the patients are afraid to, or actually cannot, introduce a fair-sized tube) that the tampons are mere apologies, and do but little good; and 2, that many patients are absolutely unable to introduce them, partly through timidity or awkwardness, partly through narrowness and tenderness of the vaginal orifice. Such tubes have been devised by Thomas, Barnes, and others (see Fig. 124), but they have never become really popular, neither with physicians nor patients. I have always found it possible to instruct patients who had had children, and whose vaginal orifices, therefore, were not too narrow, to introduce an ordinary-sized tampon themselves by assuming the dorsal position with separated thighs and pushing the tampon upward as far as possible with the fingers. But, it was not to be denied that such tampons rarely reached or remained in the fornix vaginæ where they were wanted, and that generally a **T**-bandage was required to prevent their slipping out of the vagina during walking. Only through a speculum and with a practised hand can a tampon be placed in the fornix and in close apposition with the cervix as it should be.

I shall refer to the subject of tampons more at length in the chapter on that subject. Glycerine injections have been found beneficial in vaginitis and ulcerated conditions of the vagina, acting simply as an emollient with the very slight caustic effect peculiar to glycerine added. The vagina may, for the same purpose, be bathed in glycerine through a round speculum.

It may be mentioned as a point of practical value, although not quite in place here, that rectal injections of glycerine and water (℥ j. to the pint) will produce an alvine evacuation, when every other form of enema has failed. I have also found enemata of pure glycerine of great benefit in tenesmus and catarrhal proctitis.

Emollients.—The fluid emollients, such as the vegetable oils, chiefly oil of olives and poppies, are but little employed in gynecological practice at the present day, the unctuous substances, especially vaseline, having superseded them. However, in acute vaginitis, particularly the adhesive variety in old women, and in wounds and injuries to that canal, frequent bathing of the vagina with warm oil through a speculum, or the daily introduction of tampons soaked in oil may prove healing and soothing. There is no special advantage in the oil of poppies, except, perhaps, its cheapness; for it possesses no narcotic properties.

I shall speak of the use of emollient ointments presently, when I have concluded the fluids.

Narcotics.—The indications for the use of narcotic substances as vaginal applications are contained in one word—pain, pain in the pelvic organs. Such pain may exist during acute or chronic inflammation, or as a symptom of cancerous disease. The absorptive power of the vaginal mucous membrane is comparatively slight, but this property is vastly increased when the epithelium is abraded or an actual loss of tissue exists, and the absorbents are laid directly bare. In cancerous ulceration, therefore, local narcotics exert a much more beneficial effect than in areolar hyperplasia or pelvic cellulitis. And equally should more caution be employed as to the dose in the former than in the latter cases. The inconvenience common to the employment of all vaginal tampons, that is, the difficulty experienced by all women in introducing them themselves as often as they should be used, has given the preference to the application of narcotics, as well as astringents to a certain extent, in the form of suppositories, which, so far as narcotics are concerned, may be either used per vaginam or rectum. The latter method is generally preferred, because the greater absorbent power of the rectal mucosa renders the effect a much more rapid and certain one. But there are conditions when the direct application of the narcotic to the cervix seems advisable, and this is especially the case when a mere soothing, only mildly narcotic effect is desired, which will not influence the whole system to a marked degree. Thus, in the pelvic neuralgiæ of areolar hyperplasia and chronic pelvic cellulitis very decided comfort can be afforded the patient by adding one-half to one drachm of the tincture of one of the narcotics (opium, belladonna, conium, hyoscyamus) to the glycerine in which the tampon is soaked, or by dipping the cervical end of the tampon in the tincture. In dysmenorrhea, too, such tampons, especially with belladonna, may relieve the pain, if applied several days previous to the expected flow.

In cervical cancer the hydrate of chloral in solution (one drachm to the ounce of glycerine, or stronger, if this proves insufficient) is not only an excellent anesthetic but also a disinfectant. A tampon is soaked in a sufficient quantity of the solution and introduced through a speculum up to the cervix, and retained there by a second dry tampon from twelve to twenty-four hours. This application is often the only local application which will give relief in cancer of the uterus, and it is free from the positive narcotic, constipating, and disagreeable after-effects of the only other reliable narcotic application, morphine suppositories. Conium is supposed to have a specially beneficial effect in cancer, but I confess I have not been able to detect its advantage over opium or chloral.

The bromides of potassium, ammonium, and sodium may be employed in saturated or strong solution (ʒ ij. to ℥ j. glycerine and water equal parts) on cotton tampons in those cases where a general soothing effect is desired, quite as much as the local anesthesia. Such cases are chiefly those of hysteria dependent on some local disease, mainly hyperplasia uteri. All these narcotic tampons should be retained for at least twelve and generally twenty-four hours, and be repeated daily, or as often as necessity may require. If the circumstances of the patient admit, the regular administration of local narcotics in this manner by the physician, or by the patient herself if she is dexterous enough to introduce the tampons properly, is decidedly preferable to rectal suppositories. Neither the immediate nor ultimate constitutional effects are so marked or objectionable as when the narcotic is absorbed from the rectum.

Disinfectants.—I have introduced these agents into this section for the sole purpose of stating that they may be very conveniently and efficaciously applied on cotton, which is saturated in a solution of the disinfectant (1 to 2 : 100 parts of water or glycerine and water), squeezed dry and introduced through a speculum; the tampon is removed after twenty-four hours. The use of disinfectants in this manner is indicated after operations on the uterus, cervix, or vagina, or when it is feared that foul discharges from an open wound in either of these parts may be absorbed. There is no actual advantage in one of these agents (carbolic acid, thymol, chlorinated soda, or boracic acid) over the other, although by reason of its want of odor and unirritating quality, the boracic acid is highly praised by some gynecologists. As a destroyer of foul odors the chlorinated soda, or plain chlorine water is, in my opinion, the most efficient and reliable. Care should be taken to try the strength of these solutions on the finger or tongue before introducing them for a longer time into the vagina, where they might easily produce excoriation.

γ. *Ointments.*

The medicinal agents which may be employed rubbed up with lard or some form of cerate belong either to the class of astringents, alteratives, emollients, or narcotics. Of the astringents, the nitrate of silver, tannin, alum, zinc, copper, and bismuth may be employed, best smeared on tampons of cotton which are retained for twelve to twenty-four hours. The proportions of the agent to the vehicle will vary from ten grains to one drachm to the ounce. I am not aware that the employment of these agents in ointment form offers special advantages over that in solution, when a tampon is soaked in the fluid and left *in situ* for the same length of time. Certain of the alteratives, however, are best employed as ointments, chiefly one which I have not yet mentioned, the mercurial ointment. In conjunction with the unguentum potassii iodidi (℞. Ung. pot. iod., ℥ j.; ung. hydrarg., ʒ ij.) this ointment is very beneficial in the exudations of pelvic cellulitis, applied on the upper end of a conical tampon and retained for twelve hours. The ointment of the iodide of lead (ʒ ss. to ʒ j. to ℥ j.) may also be used in similar cases in the same manner.

The vegetable narcotics are likewise useful in this manner, the powder or solid extract being rubbed up with lard or vaseline in the proportion of gr. xx. to ʒ j. to the ounce, the strength depending partly on the degree of effect desired and the amount of ointment applied on each tampon. The hydrate of chloral may also be rubbed up and used in this way.

The chief utility of unctuous substances, however, is as an emollient, the principal agent of this class (the ordinary lard having been relegated to poor practice) being the modern cosmetic vaseline or cosmoline, a product of petroleum. It possesses the great advantage of not becoming rancid, is neat and clean, and deodorant and disinfectant in itself. I have already sung its praises as a covering for the finger and speculum in ordinary vaginal examinations. As an excipient for medicinal substances it is decidedly superior to the cerates. But the soothing and healing properties of vaseline render it particularly adapted to those cases of vaginitis in which caustics and astringents have been used (as solution of nitrate of silver) or after active cauterization of the cervix (as with nitric acid or the actual cautery), also after exfoliative inflammation or ulceration of the vagina, in which adhesions are to be prevented. In acute vaginitis, an ointment of nitrate of silver in vaseline (gr. x. to xx. to ℥ j.) may be rubbed over the vagina through a cylindrical speculum, and a tampon covered with the same introduced. This application is by some preferred to the fluid already described. But, aside from its advantage over the cerates as a vehicle for medicinal substances, it is chiefly as a covering for tampons in all cases where the hydragogue effects of glycerine are not desired that vaseline is employed. It is always fresh and clean, and keeps indefinitely. If desired, its antiseptic properties may be enhanced by rubbing up five to ten grains of carbolic or boracic acid or thymol with it, and this is an excellent precaution, above all in obstetric practice. At a warm temperature it becomes almost liquid, and this fact should be borne in mind when rapidly removing it from the vessel, lest it drop on the floor or clothes. There can be no doubt that vaseline will soon entirely supersede the ancient cerates, if it has not already done so in this country. Certainly, the necessity of writing a special article on the excellencies of this substance in gynecology, as was recently done in France by Sinéty, has not occurred to any of our specialists, who have used it freely since its first introduction. Various modifications of vaseline have recently been introduced by the Myro-Petroleum Manufacturing Company of Boston, under the names of myro-petroleum album, No. 1 (cerate), No. 1 (fluid); myro-petroleum nigrum, No. 2; paraffine soap, No. 3, and glycero-petroleum, No. 4. I have frequently used the cerate and found it excellent as an emollient and healing application. With the others I have as yet no experience. The paraffine soap is claimed to have healing properties in erosion of the cervix.

It is abundantly apparent, from the manner in which these ointments are to be used—namely, on cotton or wool tampons—that they are to be introduced through the speculum, whether round, bivalve, or Sims is entirely immaterial. The patient herself may be able to do this without a speculum, if the vaginal orifice is patulous and she sufficiently dexterous. In large gaping vaginæ, as in prolapsus, a tampon covered with lard or vaseline may be rolled in tannin or alum (and sugar) powder and pushed up by the patient herself, to be renewed every day. Very good results have been obtained in prolapsus by this method.

Ointments, if melted, may be injected into the vagina through a syringe, one of hard rubber or glass being best used for the purpose. I have thus found it convenient to inject melted vaseline as an emollient in a case of accidental cauterization of the vagina with chromic acid, and puerperal injury of the canal might afford an indication for the same application. The syringe need not hold more than one ounce and should have a nozzle at least two inches long. Medicated ointments are not used in this manner, since their fluidity will prevent their retention and absorption.

There may be other medicinal substances which have been used as local applications to the cervix and vagina by this or that practitioner in this or that country. It would obviously be next to impossible to collect all the various agents which have thus been employed at different times. Such as have made for themselves a reputation, great or small, I have endeavored to mention, and trust I have omitted none of importance. There is still one agent, largely used internally, per rectum, vaginam, and uterum, and hypodermically, which has also been employed by some as a local application to the cervix. It is ergot, either as fluid extract on cotton (with or without glycerine), or as ointment. Dr. Dabney reports having used with success in cervical hyperplasia the following preparation painted twice daily on the cervix: ℞. Ergotin, gr. xx.; tr. iodinii, fl. ʒ j.; glycerinæ, q. s. ad. ℥ j. M. Or the following applied on saturated cotton and inserted into the vagina at bedtime: ℞. Ergotin, or Squibb's ext. aq., ʒ ss.; extr. belladonnæ, gr. vi.; aquæ, glycerinæ, āā ℥ iv. M., to be removed next morning.

I have never employed ergot in this manner, believing the absorbent property of the covering of the infravaginal portion of the cervix and the vaginal canal to be too slight to expect great benefit from this drug so applied. Still I have stated, under Narcotics, that such absorption undoubtedly takes place to a certain extent, the more the larger the surface to which the agent is applied; and that this absorption is greatly increased by abrasion of the epithelium. I do not therefore deny that ergot may act beneficially in this manner, although I should expect much more decided effect from it if applied in rectal or uterine suppositories.

δ. *Vaginal Suppositories.*

Any of the solid mineral substances enumerated above can be rubbed up with the excipient ordinarily employed for the purpose, cocoa butter, and employed in the form of suppositories. These may be made either with the fingers or by being cast into molds (in which case the medicine is stirred into the melted butter), or much better by pressure in a mold-machine, the powdered butter with the medicine rubbed up with it being put dry into the mold. The latter suppositories are much smoother and more compact and regular than those made by the fingers or cast in molds, and possess the advantage of not having been heated, whereby their medicinal property might have been changed. These facts apply equally to vaginal and rectal suppositories. Vaginal suppositories are as a rule made about twice the size of rectal, containing at least one drachm of cocoa butter to barely one-half drachm for the rectal. They are smoothly pyramidal in shape, the pointed end being first introduced. Rectal suppositories are frequently made conical, like a lead-pencil, and are then introduced with a piston-tube. I have not succeeded in discovering the advantage of this method of inserting them, having found it more difficult to induce patients to introduce the tube than to push the round pyramid of a suppository into the rectum with the finger. By oiling or wetting the suppository its introduction is greatly facilitated.

Suppositories (vaginal and rectal) are also made of gelatine, being cast in molds of different sizes. This form of suppository was largely introduced by Flockhart & Clarke, druggists, of Edinburgh, who made them at wholesale; but, on account of the numerous molds and greater care required, and the absence of any positive advantage over those of cocoa butter, they have not, to my knowledge, become popular in this country. All the mineral substances used for vaginal applications can be combined in solution with the gelatine suppositories, and also some of the fluid substances used for the same purpose, which, it is true, is an advantage over the butter plugs with which fluids cannot be combined. Gelatine suppositories, however, require to be kept in air-tight bottles, as when dry and hard they do not readily dissolve. Soluble gelatine capsules containing a certain quantity of the agent to be employed have also been manufactured. Of the medicinal agents employed locally in various affections of the cervix and vagina, those applied in the form of suppositories are: *Astringents:* Tannin, alum, sulphates of zinc and copper, acetate of lead, nitrate of silver, nitrate of alumina. *Alteratives:* Iodine, iodide of potash, iodide of lead. *Narcotics:* Extract of opium, belladonna, conium, stramonium, and hyoscyamus, hydrate of chloral, iodoform, bromides of potash, ammonium, and sodium. *Disinfectants:* Carbolic acid, thymol, boracic acid.

A combination of these agents is often beneficial; thus a disinfectant or narcotic may be added to an astringent or alterative if the discharge be offensive or pain exist, or two astringents (as the sulphate of zinc and copper), or two or more narcotics (as a bromide and chloral, with a narcotic extract) may be combined in the same suppository. It is always a good plan to counteract any pain which may be caused by an alterative or astringent by the addition of a mild narcotic. In cases where the narcotic effect is the one chiefly to be desired, as in vaginismus, a bromide and a narcotic extract (ammonii bromid., gr. x., extr. belladonnæ or stramonii, gr. ij. to v.), act best together; where a disinfectant influence is called for with the narcotic effect, as in carcinoma, the hydrate of chloral alone, or the extract of conium, gr. iij., with thymol, or boracic or carbolic acid, one to two grains to the suppository, make an excellent combination. The general indications, already repeatedly referred to as governing the use of all these drugs in special cases, will influence their selection, dose, combination, and repetition in this form as well.

The quantity of each of the astringent and alterative agents to be used in each vaginal suppository varies from 5 to 10 grains; that of the narcotics from 2 to 5 grains of the extracts; 10 to 30 grains of the hydrate of chloral and bromides, and 5 to 10 grains of the iodoform; that of the disinfectants 1 to 2 grains, each suppository containing at least 1 drachm of cocoa butter or gelatine, or 2 drachms if the vagina is very capacious.

The suppositories are introduced at night when the patient is in bed, opportunity thus being given for their active agents to be absorbed or exert their local effect before the patient rises and the melted excipient escapes from the vagina. If it is desired to confine the action of the suppositories chiefly to the upper portion of the vagina and the cervix, it is well to introduce a glycerine tampon immediately after the suppository. This is a good plan with the alterative suppositories and those from which a direct anesthetic effect is desired on the cervix. A cleansing or hot injection (according to necessity) is to be used on the next morning. It is always well, to avoid possible oozing from the vagina, to direct the patient to wear a genital cloth during the night, after having introduced a suppository.

In virgins in whom the hymen interferes with the introduction of a speculum and the direct application of medicines to the cervix and vagina otherwise than by weak injections, these suppositories form a very convenient means of applying stronger agents when such are indicated. This is frequently the case in chronic leucorrhœa and cervical erosion. Their greatest advantage is their introduction by the patients themselves. In this way the certainly more thorough and therefore more effectual application of the agent by the physician after one of the methods already described, can be limited to intervals of once a week or less, and much trouble and expense be saved the patient. Also, a milder application can thus be kept up during the interval between the strong measures. I thus frequently give patients with hyperplasia uteri and cellulitic deposits suppositories of iodide of lead or iodoform to introduce every night, while I make the more powerful application of tincture of iodine but once a week, and thus keep up a steady alterative action and get good results. It should be added that the unpleasant odor of the iodoform is best neutralized in suppositories by adding one or two grains of thymol, or, in default of this, 5 grains of tannin to each suppository.

The following list of medicated vaginal suppositories is taken from Halliday Croom's little book on "Minor Gynecological Operations and Appliances." The enumeration of the agents thus employed, their therapeutical action and doses, may prove serviceable for ready reference.

Atropine	Sedative	$\frac{1}{20}$	grain.	
Belladonna	"	2	grains.	Alc. ext.
Opium	"	2	"	
Morphia	"	½	grain.	
Bismuth oxide	Cicatrizing and emollient.	15	grains.	
Borax	" "	15	"	
Zinc oxide	" "	15	"	
Tannin	Astringent	10	"	
Alum	"	15	"	
Alum and catechu	"	15	"	of each.
Alum and iron	"	10	"	
Acetate of lead	"	7½	"	
Acetate of lead and opium.	"	5	"	2 grs. opium.

Matico	Astringents	10 grains.	
Gallic acid	"	10 "	
Perchloride of iron	Hemostatic	5 "	
Persulphate of iron	"	5 "	
Sulphate of zinc (dried)	Caustic	10 "	
Carbonate of soda	Antacid	15 "	
Iodide of lead	Alterative and resolvent.	5 "	
Iodide of lead and atropine	" "	5 "	$\frac{1}{20}$ atropine.
Iodide of potassium	" "	10 "	
Mercurial	" "	30 "	(Ung. hydrarg.)
Bromide of potassium	" "	10 "	
Carbolic acid	Disinfectant	5 "	

ε. *Insufflation.*

Any powder may be blown into the vagina and against the cervix. But, of course, it is admissible to use only such agents in this manner, the action of which, when left in contact with the mucous membrane for some time, is not injurious. The strong styptic, caustic and astringent powders, such as the salts of iron, pure alum, sulphate of zinc and copper, should not be used in this way. But tannin, alum and sugar, or alum with starch or powdered slippery-elm bark (equal parts), or iodoform, or tannin and iodoform, or bismuth, will be very beneficial when applied in this manner. The powdered tannin and the diluted salts of alum and zinc, and iodoform, with or without tannin, are most indicated. The chief advantage of insufflation is that the patients can do it themselves by means of a slender metal tube with a tip perforated by many small holes, through which the powder is projected by a rubber bulb at the other end. A homely and inexpensive contrivance of the sort is the ordinary insect-powder bellows. An objection is the ready clogging of the mouth of the tube by the moist powder, which may prevent the spray after the first trial. But this can be avoided by careful cleansing. For the use of the physician the insufflator possesses no particular advantage, since, if an examination has to be made, the powder can more easily and quite as effectually be applied to the vagina and cervix by being placed into the cylindrical speculum with a spoon or spatula. Through the Sims speculum, however, an insufflator is convenient. A protecting cloth should always be worn to prevent the powder dissolved in the vaginal mucus from oozing over the labia, and producing smarting or soiling the linen.

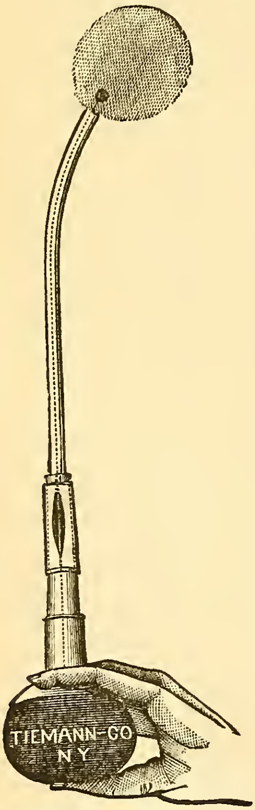


FIG. 120.—Powder insufflator.

ζ. *Spray and Vapor.*

The liquid spray has been used in medicine almost exclusively for the application of medicinal agents to the throat and posterior nares. Recently its use has been recommended for the interior of the bladder and urethra, but I believe it has not as yet become popular in diseases of these latter organs. It might be employed with equal facility and utility for the vaginal canal and the cervix, and has actually been used on the endometrium, where it is found particularly difficult to apply fluid agents effectually and safely. The chief advantage of the spray in the vagina would be that fluids which now must be applied by the physician through a speculum, all excess being carefully removed at once in order to prevent the sound external parts from being touched (such as strong solutions of nitrate of silver, zinc, or copper), could be used by the patient herself whenever directed. The amount of fluid thrown in by the spray apparatus is so small (unless an excess be intended) that an escape is scarcely to be feared.

Only such agents as are soluble in water or glycerine are available for the spray.

A disadvantage of the vaginal spray applied by the patient is that the progress of the disease would not be so carefully watched and the remedy applied only when inspection shows its necessity, as when the physician himself makes the application at stated intervals.

The apparatus for the vaginal spray is very simple, consisting only of an ordinary rubber bulb, a small bottle containing medicated fluid, and a long, straight, or slightly curved metal nozzle some six inches long, for introduction into the vagina. All these parts are connected by rubber tubing. The patient takes the spray in the usual dorsal recumbent position, once or oftener every day. Only two or three compressions of the bulb should be made each time, in order to prevent an excess of fluid being deposited on the vaginal walls. The indication for a particular remedy and the frequency of its repetition are governed by rules already laid down. Both these methods, insufflation of powder and spray, have not been as much used as they should be. The introduction of proper durable apparatus and the comprehension of its advantages would probably cause it to supersede in a great measure the, in very many instances in a therapeutical sense, entirely indifferent medicated vaginal injections.

The application of the vapor of chloroform and of carbonic acid gas to the cervix, recommended years ago by Simpson and Scanzoni as an anesthetic in painful affections of that organ (chiefly cancer) and of the pelvic organs generally, has long been abandoned. Scanzoni experienced one fatal result from the entrance of the carbonic gas into the veins. Bernard saw a case of carbonic toxemia after the same application; and the effect of the chloroform vapor is too evanescent to be valuable as a substitute for the local narcotics (on tampons and in suppositories) already mentioned. Chrobak in his recent work speaks of benefit derived from the chloroform vapor in excessive sexual excitement accompanying pruritus vulvæ, and in a case of neuralgia of the pudic nerve. He applied the vapor by means of an ordinary atomizing apparatus so modified that the efferent tube does not touch the mixture of chloroform and oil contained in the bottle; in this manner only vapor is expelled when the bulb is compressed. A vaginal nozzle is attached to the efferent tube. The application must be continued for several minutes; it first produces burning, then cold, and gradually anesthesia, which may last several hours.

V. Tamponade of the Vagina.

The vaginal tampon is employed for various purposes, the chief of which are: 1, as a carrier for the application of medicinal agents to the cervix and vagina; 2, as a means of retaining certain substances introduced into the uterus in their proper position—such as pledgets of cotton, laminaria, and sponge-tents, stem-pessaries; 3, as a means of retaining the uterus itself in its normal, or some other position which it is desired to give to it, as in displacements, and as a means of preventing a relapse of a prolapsed ovary; 4, as a mechanical support and stimulus to the pelvic vessels, and an alterative to the pelvic tissues by means of the direct pressure it exerts on them; 5, as a protective to the ulcerated, inflamed or swollen cervix or vaginal walls, to prevent friction and an increase of irritation; 6, as a means of dilating or separating the vaginal walls—a substitute for a hard or distensible dilator—in constriction of the vaginal canal, after operation for vaginal atresia or stenosis, in vaginismus and spasm of the levator ani muscle; 7, as a hemostatic by its mechanical pressure and size. The action of the tampon is really by virtue of its dilatation of the vaginal pouch, and this section might, therefore, properly be combined with Nos. 4 and 5; still, the great importance of this use of the tampon leads me to discuss it separately; 8, as an absorbent of vaginal and uterine discharges, which are thus prevented from touching the external and sound parts, and as a protective to the sound parts from caustic substances applied to the uterus or the cervix. Several tampons may be employed for different purposes at the same time in the same case, as when it is desired to retain the uterus in a certain position while the first tampon is applied over the cervix to keep a laminaria or stem, or cotton pledget in place; and several objects may be intended by the same tampon at once, when a protective and dilating influence are desired at the same time, or a hemostatic effect is added to either of these, or an astringent is combined with a supporting effect.

1. *As a carrier for the application of medicinal agents to the cervix and vagina.*

In the preceding pages frequent mention has been made of the introduction of medicinal agents into the vagina and against the cervix, on pledgets of cotton or wool, so-called "tampons." But neither the substance of these tampons nor the details attending their use, and the annoyances and even danger following their abuse, have been discussed. A description, therefore, of the manufacture and employment of medicated tampons in all the minor practical details, is in order. Many of these minutiæ may seem trivial or frivolous; but so little is said about these matters in the ordinary text-books, and even the smallest details may prove valuable and save annoyance, that I feel sure the beginner will appreciate the object intended in these pages. The material preferred for the manufacture of tampons is generally cotton, as it comes in rolls or sheets, preferably the former. It is not necessary to use the purified, so-called "absorbent" cotton for tampons, unless a special degree of absorption of the fluid or an esthetic effect is desired; the absorbent cotton is used mainly as a vehicle for intra-uterine applications. Some gynecologists prefer tow, plain or carbolized, and Dr. Skene, of Brooklyn, is very enthusiastic in his advocacy of a refined preparation of that article known as "marine lint" for tampons. The disinfectant property of the tow is no doubt an advantage, but its brown color has always made it objectionable to me, both as a substance for tampons and for vulvar pads in the lying-in chamber; this color prevents the appearance and character, and the tar-smell the odor, of the discharges from being clearly ascertained, and thus removes a valuable diagnostic auxiliary. It is for this reason, also, that I prefer the plain white cotton as a mop in the dressing-forceps to sponges on holders or to tow in the ordinary cleansing manipulations of the cervix during a specular examination.

Accordingly as it is desired to keep the medicinal agent in contact with the cervix alone, or to place it against the vaginal walls, the tampon is differently shaped and constructed. When a tampon is to be merely soaked in glycerine, or some glycerole (as of tannin or iodoform), or a dry powder is to be placed against the cervix, the tampon is made as shown in Fig. 121, the cotton being flattened into a disk about two inches in diameter and one-sixth of an inch thick, with a string loosely tied about its middle so as to constrict it but slightly. But, if a patient wearing one of these disk-tampons is to move about, it will generally be advisable to support this tampon by another of a conical shape, especially if the disk be soaked in a fluid liable to escape from the vagina and stain the linen. The conical tampon is made by rolling a handful of cotton-wool tightly together to the required size and shape, and tying a stout twine firmly around its middle. It is always convenient and time-saving to prepare these tampons in bulk and keep a supply on hand. A number of conical tampons are rapidly made by spreading out the whole roll of cotton (which often comes in loosely compressed sheets, but unglazed, remember; the glazed cotton does not absorb well), and then rolling it up again tightly, as one rolls a roller-bandage, until the desired thickness is reached. This rope of cotton, which is about two feet long, is then detached from the remainder of the bundle, and twine is tied tightly around it at intervals of two inches, beginning and ending about one inch from either end. The roll is then cut through between the twines, and a certain number of conical tampons two inches in length by one inch thick are obtained. (Fig. 122.) This is about the size of the ordinary tampon as applicable to vaginæ of normal width; in abnormally distended vaginæ, or where it is intended to distend the canal (as in hemorrhage) the size of the tampon should be proportionately increased. If the vaginal pouch is to be tamponed, the tampon should be round like a ball, of the size of an English walnut, and not too tightly wrapped, so that it may adapt itself to the shape of the pouch. But a conical tampon may also be used for this purpose, being laid crosswise into the pouch. It is not superfluous to mention that the twine should be both sufficiently strong, so as not to break when the patient attempts to remove the tampon, and, long, so that it does not slip within the vagina and thus evade the patient's fingers. It is very disagreeable to be called to remove a tampon the cord of which has broken or cannot be reached,

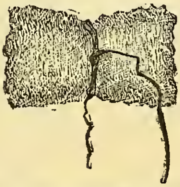


FIG. 121.—Flat disk tampon.

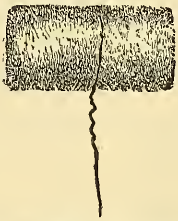


FIG. 122.—Solid conical tampon.

particularly if that tampon has become offensive, as it generally does within forty-eight hours. And the removal of such a tampon is by no means an easy task, being perhaps impossible by the fingers alone if it carried an astringent. Even with the long dressing-forceps it is an unpleasant and tedious matter to grasp the compressed and slippery cotton without inadvertently seizing the vaginal wall in the forceps. I have found that by introducing two fingers and hooking them above the tampon, its removal is much facilitated in a roomy vagina. But where the vagina is narrow or the tampon large, it will be found much the best plan to put the patient on the side, introduce a Sims speculum, or use the first two fingers of the left hand as a substitute and expose the tampon, before attempting to remove it with the forceps.

The twine depending from the tampon should be about eight inches long, so as to protrude some two or three inches from the vagina. Strong white twine is the variety generally employed.

Dr. Edwin F. Ward, of New York, recommends very highly a tampon prepared in the following manner:

"Roll a strip of clean, carded cotton around a strong linen thread, until the desired size is reached, then tie the thread in a double knot at one end of the tampon, and tie the ends of the thread together six or eight inches from it. The tampon then presents something the appearance shown in the diagram.

"The cotton may be torn in strips of an inch and a half or two inches in width, and eighteen or twenty inches in length, from the sheet wadding which is sold in the dry-goods shops by the yard. It is about a yard wide, and glazed upon both sides. This glazing should be removed, from the outer side at least, of the strip.

"Cotton in a very convenient form may be obtained from a cotton yarn or thread mill, where, just before it is twisted, it is in most excellent shape and condition for making these tampons. The tampon should be constantly compressed during the winding, in order that it may have the necessary degree of firmness to enable it to retain its shape when placed in any desired position within the vagina. As traction by the thread will always cause the long axis of the tampon to become parallel with that of the vagina, no difficulty is experienced in its removal."

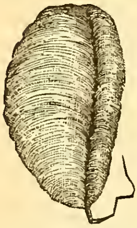


FIG. 123.—Vaginal tampon. (Ward.)

One rule it is very important to bear in mind in connection with the use of tampons, viz.: never to omit to tell a patient that she has such an article in her vagina, and that she is to remove it by the string within a given time. My nurse has strict orders always to remind patients again before they leave, of the presence of the tampon, and that it must be removed within twenty-four hours. It is also well to impress upon them not to use too much or sudden force in traction on the cord, for fear of breaking it, and that traction should be made downward toward the perineum, the fingers grasping the cord as closely to the vulva as possible. Tampons should generally be removed after twenty-four hours. If allowed to remain longer, they are very liable to become offensive, even when carbolized. This is especially the case when a number of tampons have been introduced for uterine hemorrhage and left untouched for forty-eight hours, as is frequently necessary in dispensary practice; the blood gradually saturates the cotton, decomposes, and the tampons, in spite of carbolization, are exceedingly offensive when removed—the more so if the weather is warm. When circumstances permit in such cases, it is advisable to renew the tampons every day, even at the risk of re-exciting the hemorrhage. It is not practicable to carbolize the tampons so strongly as to effectually prevent decomposition, since the acid, together with the pressure, would excoriate the vagina. In this respect the other disinfectants, chiefly solution of thymol, are preferable, since they can be used in a more concentrated solution without cauterizing. In removing tampons, when a number have been introduced, care should be taken not to overlook one ; I have seen a chill and rise of temperature simulating septicemia follow the accidental retention of a small tampon soaked in a dilute solution of the chloride of iron, in a case of amputation of the cervix, symptoms which at once subsided when the tampon was detected and removed and the vagina washed out. It is therefore advisable to remove a batch of tampons, even when supplied with traction-cords, with forceps through a Sims speculum, rather than trust to withdrawing them by the cords, and to make note of the number of pledgets introduced. I shall explain farther on why, as a rule, a column of tampons should be introduced and removed only through the Sims by the physician, and cords are therefore not required.

I have already mentioned that other substances than cotton, such as oakum or marine lint, or wool, may be used for tampons. Where a mere disinfectant effect is desired, the tow, especially if carbolized, is superior to cotton; where an expansive elasticity is called for, as in fixing the uterus or dilating the vagina, the wool excels either cotton or tow. Practically, cotton answers every purpose if properly prepared, and being most easily procurable, is undoubtedly most popular. Sponges are also used as tampons, as well as English lint-sheeting rolled into the required shape and size. Sponges answer very well when the patient herself is to introduce the tampon soaked in pure glycerine or some astringent or disinfectant solution in glycerine, or covered with some ointment. But, as a rule, it is best to throw away the tampon and replace it by a fresh one every day, for it is liable to become foul, no matter how carefully it is cleansed; and this would obviously be rather expensive with sponges. The same objection applies to English lint, which absorbs fluids very rapidly and thoroughly, and forms an excellent tampon. A very plausible substitute for these substances is recommended by Dr. Frank P. Foster, of New York, in the shape of ordinary lampwicking, which is cheap, abundantly absorbent, and resilient. Dr. Foster introduces the wicking through a speculum, packing in with the forceps strip after strip of the unwound wicking (it comes wound in balls) until the vagina is filled. The wicking is then cut off some two or three inches from the vulva, the tampon supported by finger or forceps, and the speculum withdrawn. The great advantage of this wicking-tampon, according to Dr. Foster, is that the patient, by pulling on the piece projecting from the vulva, can remove the whole mass by simply unwinding it piece by piece; therefore, neither in introduction or removal has a large mass to pass and distend the vaginal orifice. I have not had occasion to employ this tampon, but, judging from the description, am very favorably impressed by it, especially in cases where it is necessary to introduce a number of tampons the removal of which the patient herself is to accomplish. This is frequently the case with patients living at a distance, in whom the supporting, dilating, or hemostatic tamponade is required. I have already referred to the difficulty of removing such a multiple tampon, except with the forceps through a speculum. If a number of separate tampons are introduced, each with its string attached, and the patient is told to remove them herself, the multiplicity of cords renders it impossible for her to know which tampon to remove first, and she may quite as well attempt to withdraw the uppermost one first as the lowest, and, if she does this, will either fail entirely or drag the whole mass through a vaginal orifice perhaps large enough only to admit one tampon at a time. This occurrence may be avoided by attaching strings of different color or length to the several tampons, the patient making note of the order in which to pull on these strings, or making knots in each string—one knot for the first tampon to be removed, two for the second, and so on. I have endeavored to overcome this difficulty (which, however, really comes into play only when the vaginal orifice is narrow, for a gaping vulva offers no obstacle to the removal of even a large mass of tampons) by introducing first a large flat tampon with a stout cord, which filled the whole vaginal pouch, and then placing smaller flat tampons without cords against this, so that traction on the one string would remove all the tampons together. It must, however, be remembered that occasionally a tampon may be left behind in this manner, an occurrence to be detected by remembering the number of pledgets introduced and counting them on their removal. As a rule, whenever it is necessary to introduce a number of tampons at the same time (which is chiefly the case in hemorrhage and uterine displacement) it is worth the while of both patient and physician to introduce and remove them *properly*, that is, with forceps through the Sims speculum, and cords therefore are not required.

The old-fashioned kite-tail tampon, where a number of pledgets are tied one after the other on one string, by which they are removed, is certainly useful when nothing better presents.

The lamp-wick tampon of Dr. Foster is merely an improvement (chiefly through the porosity and firmness of the wicking) on the old tampons of long strips of linen or calico, which, after being boiled, were soaked in the fluid to be used for the occasion and packed into the vagina; they were withdrawn by the piece allowed to protrude, precisely like the wicking. A tampon which was highly lauded and really is excellent in cases of hemorrhage, chiefly during miscarriage, is the ordinary roller-bandage, which is introduced either through or without a speculum, the central portion being pushed upward by the finger as soon as the roller touches the cervix, and plugging that canal. In this way not only the vagina, but also the cervix, are tamponed. It is removed by the tail of the bandage, which is left hanging from the vagina. This bandage may be medicated, but its use is chiefly adapted to cases of hemorrhage. Ordinary picked linen lint, such as is used largely in surgical practice, is no longer employed for vaginal tampons. It is too coarse, stringy, and not sufficiently cohesive. For hemorrhage, dilatable rubber bags (so-called colpeurynters), or, for want of anything better, an ox- or pig's-bladder, form excellent tampons. For purposes of medication they are useless.

I have already stated that ordinary loosely picked cotton-wool, as it comes in rollers two feet long by six inches thick, is that commonly used and perfectly satisfactory for tampons. The refined bleached cotton-wool, from which all fatty matters have been extracted, is a decidedly more elegant, but also more expensive article, which possesses only the other advantage of absorbing fluids more readily, whence its trade-name "absorbent cotton." It is used in ordinary practice, chiefly for intra-uterine applications, being wrapped on a stick or applicator. I always employ it to tampon the cervix or uterine cavity, and occasionally as a vaginal tampon when I wish thorough saturation of the cotton by the medicated fluid, as in the application of strong caustic solutions to the cervix and vagina in carcinoma (chloride of zinc), or when the absorption of discharges is intended. I therefore always keep both the ordinary and the absorbent cotton in my drawer, ready for instant use. For the removal of fluids and secretions from the cervix with the cotton-wrapped stick or forceps, the absorbent cotton excels the ordinary variety.

The manner of using medicinal agents in powder, solution, or ointment on tampons, has already been described in the preceding chapter. I need merely repeat here that the powders are sprinkled on the dry tampon, or better, the tampon soaked in water or glycerine, or covered with vaseline, is rolled in the powder; that solutions are applied by saturating tampons in them and expressing the latter more or less before introduction, or the medicated tampons may be allowed to dry and be used in that state (particularly advisable for disinfectant—carbolic, thymol; styptic—solution of persulphate of iron; and alterative—iodine, remedies); and lastly, that medicated ointments are smeared over the cotton and left *in situ* until absorption has taken place. The mere emollient effect of vaseline is probably made use of more frequently in this manner than that of medicated ointments.

It is always advisable to keep on hand a supply of absorbent cotton which has been soaked in one of the following solutions and allowed to dry: Liq. ferri subsulph., 1 part to 3 of water; alum, 1 part in 12 of hot water; tincture of iodine, pure; iodized phenol, pure; carbolic acid or thymol, 1 part to 30 or 50 of water. This dried medicated cotton can be used in the quantity desired after any length of time: the iron and alum as styptics, chiefly for packing the cervical and uterine canal after discission and removal of fibroids, and in cancer of the cervix; the iodine as a disinfectant after operations on the uterine cavity, and as an alterative; the iodized phenol as a caustic in endotrachelitis and cervical erosion or cancer; the disinfectants as supporters of the above tampons, and in offensive discharges. Care should be taken to keep the iodized cotton in a well-stoppered bottle in a dark place.

The great advantage of using dried ferrated cotton in place of the freshly soaked article, as a permanent application to the cervix (as in bleeding cancer), will have been appreciated by all who have seen the liquid iron escape from the cotton and run down the vagina, in spite of all caution and previous squeezing, when the tampon is packed tight. Besides, the operator's hands are in no manner improved by squeezing out the iron-soaked cotton, an objection by no means to be overlooked by the gynecologist, who should keep his fingers not only clean, but sensitive. Powders may also be applied to the vagina by being enclosed in small bags of fine muslin, so-called sachets, which are tied at the mouth with a string long enough to escape from the vagina, and, being smeared with glycerine or vaseline, are introduced by the woman herself; or a piece of sheet-batting may be used, the glazed surface having been removed. The bag soon becomes soaked in the vaginal discharge, which mingles with the powder, and the solution thus formed oozes through the envelope. Tannin, alum and sugar (alum alone is too strong to be applied to the vagina at any time), zinc, acetate of lead, may be applied in this way, which certainly is a better method than any other of introducing astringents into the vagina when the physician is not at hand to do it.

A favorite remedy with some practitioners is the introduction of emollients in this manner; thus, ground flaxseed, slippery-elm bark, poppy-heads, or all combined, are enclosed in a fine muslin bag of the size of a small lemon, soaked in hot water, and then pushed by the patient herself up to the cervix. This is best done on retiring at night, and the poultice is renewed the next morning, to be followed by a hot injection. In pelvic cellulitis, chronic ovaritis, hyperplasia uteri, these internal poultices certainly act beneficially as local sedatives and alteratives.

A precaution of the greatest importance in applying pledgets of cotton soaked in strong caustic or diffusible substances to the cervix or vagina, is to thoroughly remove all excess of the agent by careful mopping, and then to apply tampons soaked in an alkaline fluid to neutralize any possible later oozing from the caustic cotton. It is almost incredible how, even after the most careful expression and mopping, more or less of the caustic fluid will ooze along the side of the protecting cotton after the patient has been put to bed, and the operator will find the evidence of it on removing the tampons next day. By neutralizing this possible flow, as above indicated, a perhaps very annoying slough will be prevented. The chloride of zinc is the agent particularly in my mind while advising this precaution, and the bicarbonate of soda in saturated solution is the best antidote. Nitric acid, chromic acid, bromine, can also be neutralized by this same agent. For nitric acid, I generally use oil or vaseline on the tampons.

I have already spoken in the preceding chapter of the *manner of introducing tampons into the vagina.* I there referred only to tampons soaked in glycerine, the necessity for the daily systematic use of which renders it desirable that some means should be devised which will enable the patient to introduce them efficiently herself. Ordinarily, medicated tampons require to be placed by the physician himself, through one of the various varieties of speculum, because the size of the tampon or the nature or strength of the substance with which it is covered or impregnated prevent the patient from passing it through the vaginal orifice by the fingers only. Small pledgets soaked in glycerine are usually slipped into the vagina without difficulty if the patient possesses an ordinary amount of dexterity or boldness, but larger tampons are introducible by the fingers only when the vaginal orifice is exceedingly patulous, as with lacerated perineum and in procidentia vaginæ or uteri. I shall refer to these cases hereafter.

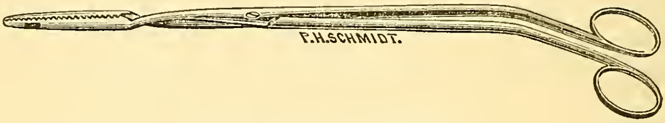


FIG. 124.—Uterine dressing-forceps.

To enable patients, therefore, to introduce glycerated or otherwise medicated tampons themselves, tubes with piston-rods have been devised by Thomas, Barnes, and others, into which the tampon is placed, and, the tube having been introduced into the vagina, pushed out with the piston. If the cotton pledget is very small, not larger than an English walnut, these porte-tampons will answer very well, although the majority of unmarried women find more or less difficulty (arising from awkwardness or timidity, as much as from narrowness of the hymeneal opening) in inserting the tube. But when it is desired to apply larger tampons as supporters of the uterus, dilators of the vagina, or carriers of a larger amount of medicinal substance, these slender tampon-tubes will be found insufficient, and the aid of the physician will be needed to apply the tampon. The same holds good when the tampon is to be placed in a certain portion of the vagina, as before or behind the uterus in the respective displacements, a maneuvre which can be properly carried out only through the Sims speculum. The extent of the usefulness of porte-tampons is, therefore, the introduction of small, soft pledgets soaked in glycerine, glycerole of tannin, or some similar solution, or covered with vaseline, medicated or not. The small size of these tampons and their limited capacity renders their benefit, with the exception of the glycerated, comparatively slight.

Of the various tubes, the hollow glove-stretcher of Barnes (Fig. 125) appears to me the most useful, as it is more easily introduced and admits a larger tampon than the others.

In chronic leucorrhea, areolar hyperplasia, and chronic cellulitis, the daily introduction through a tube of even these small tampons soaked respectively in some astringent glycerole, pure glycerine or iodized glycerine, will, for the want of a more thorough application, eventually result in benefit.

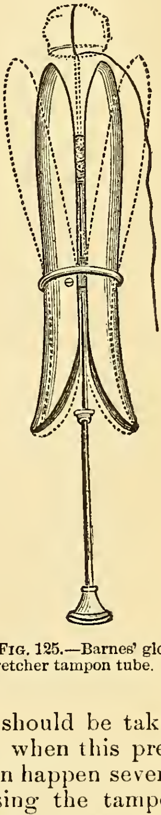


FIG. 125.—Barnes' glove-stretcher tampon tube.

The insertion of a tampon of ordinary size through a tubular or bivalve speculum is performed in the following manner: the tampon, having been soaked in the fluid and expressed so as not to drip, or covered with the ointment, or rolled in the powder, is seized with the uterine dressing-forceps and introduced lengthwise into the speculum, care being taken in doing so not to rub off the powder or ointment with which it may be covered, or to cause the fluid with which it is impregnated to ooze over the edge of the speculum and drop on the clothes. The tampon is then pushed gently forward with the forceps, the blades of which still enclose it, until it reaches the cervix (which, of course, must have been exposed before). The cord of the tampon has been allowed to hang out of the speculum. The forceps now release the tampon, and the point of the closed blades crowds the cotton well up against the cervix, if that be the purpose; if, however, the tampon is to remain lengthwise in the vagina, as when it is used to separate the walls or bring all of its surface in contact with them, this packing is omitted, and the tampon merely held firmly with the point of the closed forceps, while the left hand, which all this time has been supporting the speculum, withdraws that instrument. The tampon must be pushed up with sufficient firmness to prevent its being dislodged or removed when the speculum is withdrawn; but care should be taken not to allow the forceps-point to slip beside the cotton when this pressure is made, and injure the vaginal vault, as I have seen happen several times. This could, of course, be always avoided by pressing the tampon up between the forceps-blades, instead of with the closed blades; but I have advised the latter because I have experienced difficulty in removing the open blades from each side of the tampon when it has been tightly packed and the speculum has been removed. The best way, perhaps, is to open the blades slightly, and push with both blades separated about half an inch, when they will not be likely to slip. Any stick, like a stout whalebone applicator or a penholder, may be used to push up, pack, and hold the tampon. But I have advised the long dressing-forceps because they are (or should be) always at hand, because the tampon is seized with them, and they answer every purpose. They are an invaluable instrument in uterine practice. I always employ them as the carrier of cotton with which I wipe off the cervix or remove an excess of some fluid application, and find them far more convenient than sponge-holders or cotton-wrapped whalebone sticks for this purpose. The latter have to be wrapped afresh for each mopping, while with the forceps a bit of cotton is simply torn from the roll, and thrown into the slop-jar when soiled. For applications of fluid agents to the cervix and vagina, however, the cotton-wrapped applicator is more convenient.

In introducing a medicated tampon through a Sims speculum, care should be observed, when passing it into the vagina with the forceps, not to touch the edge of the orifice and strip off the agent, which if fluid will flow over the lower natis on the patient's clothes, and in any case may cause smarting of the sensitive vulva. When the tampon has been passed up into the vaginal pouch and properly adjusted, it is held between the blades of the forceps (which in this position and with Sims' speculum can easily be removed) and the speculum withdrawn with the tip of its vaginal blade looking backward until it emerges from the vagina. If care is not taken to keep the blade directed well backward in withdrawing it, but the point is allowed to leave the posterior wall during this maneuvre, the tampon may very readily be caught in the groove of the blade and dislodged from the fornix, or entirely removed—scooped, as it were, out of the vagina. When the speculum has been withdrawn, the dressing-forceps are also removed; indeed, their pressure against the tampon may be relaxed as soon as the point of the speculum has passed that object.

After removing the speculum, the external parts should be cleansed of any secretions or fluids which may have escaped from the vagina or tampon, and the cord so adjusted that the patient can easily find it when she wishes to remove the tampon. If there should be any oozing of medicated fluid from the vagina, or any danger of this occurring, it is well to tuck a bit of cotton loosely into the vulvar cleft, pressing it lengthwise between the labia so as to give it a certain amount of adherence. The patient should be told to remove this when she wishes to empty her bladder.

I have already stated that tampons, even when disinfected, should rarely be allowed to remain longer than twenty-four hours. It is customary to tell patients to remove a tampon which has been introduced about noon of one day, on the morning of the next, that is, after about eighteen hours. All the benefit to be derived from that tampon and its ingredients has been obtained by that time. An exception is made only when a very large astringent tampon has been introduced as a substitute for a pessary in vagino-uterine prolapse, and it is to be replaced at once by a fresh tampon, which it is not convenient to do oftener than every other day, and in some cases of hemorrhage when a too early removal might again start the bleeding. These exceptions will be referred to hereafter.

The manner of removing the tampon by the attached cord has also been described, and the precautions to be used. Ordinary medicated tampons, whether introduced by the physician through a speculum or by the patient, are generally supplied with a cord for removal by the patient; only such tampons as are designed for purposes of support or hemostasis, being applied in a particular manner and perhaps intended to be replaced at once by a fresh one, are not furnished with a string and are removed by the physician with speculum and forceps.

Should an accident occur and the cord break during the attempted removal of the tampon, it is best to introduce a Sims speculum at once and remove the cotton with forceps; or, as already stated, in the absence of such a speculum, the two fingers of the left hand or the handle of a large spoon properly bent, may take its place as a perineal retractor and expose the vagina sufficiently to enable the forceps or fingers of the other hand to seize and remove the cotton. A tampon may be removed also through a bivalve expanded to its greatest width, but this is difficult through a tubular speculum, the point of which pushes the tampon aside or crowds it into the cul-de-sac.

A cleansing injection of tepid or hot water, with or without subsequent disinfectant or astringent addition, should be taken immediately after the removal of a tampon, unless counter-indications to injections exist, such as tendency to hemorrhage. Patients should be told that after the removal of an astringent tampon they may experience some difficulty in introducing the nozzle of the syringe to the usual depth, owing to the temporary contraction of the canal, and that they need not be alarmed at this. They should also be cautioned, if there is an erosion or easily bleeding surface of any kind on the cervix, against introducing the nozzle of the syringe to its full length, for fear of striking against the eroded spot and producing fresh hemorrhage.

2. *As a means of retaining certain substances introduced into the uterus in their proper position.*—If a conical tent of cotton has been introduced into the cervical canal as a hemostatic after discission, or a sponge, laminaria, or tupelo tent has been applied, or a stem-pessary has been inserted into the uterus, some support may be required to prevent these various bodies from becoming displaced and slipping out of the uterus. Such support is not always needed, for the cotton tent may be so tightly packed as not to slip, or the dilating tents may dilate so rapidly (chiefly the sponge) as to retain themselves; or the stem-pessary may be kept in place by its bulb pressing against the vaginal wall, as is always the case in ante-displacement of the uterus. But as regards the cotton and the tents it is always safer to make sure of their being retained by placing flat pledgets of cotton over the cervix, and then supporting this flat tampon by a conical one. These tampons can be applied through a large cylindrical or a bivalve speculum, which properly exposes the cervix; but, as the object they are to support will most probably have been introduced through a Sims (at least it is most easily so introduced) the tampons will naturally be applied at once through that speculum. Neither tampon need have a cord attached, since in the case of the cotton tent the operator would, after a discission of the cervix, naturally remove the pledget himself through a speculum within twenty-four hours, and replace it by fresh wadding, and the dilating tent should also always be removed by the physician through a speculum. In some cases, however, where I introduce a medicated cotton tent into the uterus (as hereafter to be described), I place a conical tampon against the cervix and direct the patient to remove it next day and use her hot injection, the uterine tent coming away spontaneously in several days. Or I attach a thread to the uterine tent and tell the patient to remove it the next day with the vaginal tampon. The tampons should be soaked in a disinfectant glycerine solution, and are introduced and removed precisely as already described, care being merely taken to have the disk-tampon over the cervix large enough to insure its retaining its place over the external os.

If it is found that a stem-pessary is not retained, and a solid support by means of an attached vaginal pessary is not borne, or is counter-indicated, the daily application of a cotton tampon over the cervix, as just described, will answer the purpose. Since the stem would slip out if the tampon were removed without at once introducing another, it is obvious that only the physician himself should introduce and remove these tampons, therefore no cords are needed. The application of a conical or round tampon in the anterior vaginal pouch may serve to retain the stem by pushing the cervix against the posterior wall.

3. *As a means of retaining the uterus in its normal or some other position, and of supporting a replaced prolapsed ovary.*—There are numerous instances in which it is desirable to steady and support the normally situated healthy uterus immovably in its position, and where a hard pessary is not borne. As examples of such cases may be cited inflammatory and spasmodic conditions of the bladder or rectum, acute ovaritis, in which affections the constantly varying pressure of a normally movable uterus on the inflamed organs will cause pain ; or, in displacements of the uterus, ante, retro, or downward, a hyperemic and tender uterine body, or edematous or inflamed parametrium will not tolerate the steady pressure of a hard supporter. Or an inflamed and exquisitely tender prolapsed ovary forbids the use of such a pessary, and still a support of that ovary is called for. In such cases the substitution of the permanent supporter by the daily introduction of glycerated cotton tampons will, in many cases, gradually accustom the parts to the pressure, make room for a permanent pessary, and relieve both inflammation and displacement.

Such a tampon, or such tampons, to be efficient must be placed and retained precisely where the pressure is most needed. It is therefore indispensable that they be introduced through the Sims speculum which exposes the whole vaginal vault and permits free motion of the uterus. The method may be described in a few words. The uterus or ovary having been manually replaced, if a displacement existed, the cervix is exposed by the Sims and seized by its anterior lip with a tenaculum and drawn gently in the direction opposite to the spot where the first tampon is to be applied. The posterior cul-de-sac being the deepest, is generally first filled; the cervix is therefore drawn anteriorly, and a round, not too hard, cotton tampon soaked in glycerine is seized with the dressing-forceps and placed behind the cervix, where it is gently packed tight with the forceps. The tenaculum then being removed, a similar tampon is placed in front of the cervix and also packed as tight as the much more shallow anterior pouch permits. A tolerably large flat disk tampon is then placed directly over the cervix and the first two tampons, and this disk again supported by a conical tampon placed lengthwise, parallel with the long axis of the vagina. It may not be absolutely necessary to apply this last tampon if the patient is to remain in the recumbent position while retaining the tampons, but if she is allowed to walk about, the upper pledgets will surely be displaced unless supported by the cone. If the vaginal pouch is very large and wide, or if it is desired to make transverse as well as posterior and upward pressure (as in ovarian prolapse) a conical tampon applied transversely may be preferable to the ball. If entire immobility of the uterus is desired, a conical tampon, applied transversely in each of the four sections (posterior, anterior and two lateral) of the vaginal pouch, and secured by a fairly large disk and a longitudinal cone, will attain the object. These tampons must be renewed every day; and it is a good plan to have the patient remove them by the attached cords (which may be marked or of different lengths, as described above, although, as a rule, little difficulty will be experienced in removing the whole mass at once in these cases), and take a hot vaginal bath, before the physician comes to reapply them. If the patient goes to the physician's office it is certainly better that she should retain the tampons until they can be at once replaced by fresh ones, and cords are then not required. A daily hot injection, however, materially aids the treatment in these affections.

These tampons are most useful in retro-displacement of the uterus, with or without ovarian prolapse, in which cases the uterine body or retro-uterine cellular tissue is frequently too tender at the outset of the treatment to tolerate a hard supporter. If continued with sufficient perseverance, the displacement may even be cured by these soft tampons, and a subsequent hard pessary rendered unnecessary. When the retro-displaced fundus uteri is adherent, these daily emollient and hydragogue tampons, may in time, by their combined pressure and alterative action, bring about the absorption, or at least stretching of the adhesions, and permit a replacement of the organ. If there is congestion of a prolapsed ovary, or the retro-uterine parts are very relaxed and tender, the substitution of a watery solution of tannin (1: 4) for the glycerine in the tampon is recommended by Dr. Fordyce Barker.

The painting of the vaginal mucous surface over the inflamed parts with tincture of iodine before applying the supporting tampons is a good plan, but it must not be done oftener than once a week, and only the simple tincture be used, or the iodine and pressure combined will exfoliate the epidermis.

Besides in retro-displacements, I have found these daily tampons of great benefit in another variety of uterine deviation, where a heavy subinvoluted uterus anteverts and sinks down in the pelvis so that its hard cervix rests on the posterior vaginal wall into which, as the patients express it, it seems to bore. The patients complain of a steady gnawing, burning pain in the lower portion of the sacrum, which is at once relieved by lifting the cervix away from the posterior vaginal wall and supporting it. In old cases of this displacement hard pessaries are often not borne at first, and the daily glycerated cotton tampon answers admirably. I have entirely cured a lady of both her displacement and hyperplasia, as well as of a chronic ovaritis of the left side (for which, it is true, constant abdominal counter-irritation was also employed), by packing the posterior cul-de-sac with glycerated cotton every day before she left her bed, for a period of three months. She could wear no pessary, and could scarcely walk without the cotton support; with it she was perfectly comfortable. She is now, four years later, a perfectly well woman.

Such tampons are easily applied by the physician alone, in the absence of a nurse, by inserting the Sims speculum in the knee-breast position. The left hand holds the speculum and retracts the perineum, thus admitting air, and dilating and fully exposing the vaginal canal with the cervix; the right hand places the cotton with the dressing-forceps where it is wanted, and the patient lies on her left side for a few moments before rising in order to permit the air to escape and the vagina to contract about and fix the tampons. I have taught private nurses to apply the cotton in this way and have thus saved patients living out of town the trouble of coming to me and the expense of having me go to them. One precaution is to be mentioned in applying tampons in this manner, viz.: that the complete distention of the vagina by air requires rather larger and more tampons in order to insure their proper retention than is necessary in the lateral decubitus.

I have thus far spoken of tampons only for the retention of ante- and retro-displaced uteri. In lateral displacements the tampons are placed on either side of the cervix, the one to crowd the cervix away from the side toward which it is directed and bring it in the median line, the other to push up the fundus. The usual disk and cone are required. The utility of these lateral tampons is not as great as that of the posterior, owing to the shallowness of the lateral vaginal pouches. Still, in view of the difficulty of procuring efficient and supportable hard pessaries for these latero-displacements (which unless congenital, are usually due to traction by cellulitic or peritonitic adhesions) the cotton supports may be found serviceable in the comparatively rare cases of positive disturbance by this displacement.

It now remains for me to speak of the use of cotton tampons as veritable supports, as a substitute for pessaries and vagino-abdominal supporters, in cases of partial and complete prolapsus uteri et vaginæ. While in the ante-, retro-, and lateral displacements the tampons are small and correct the displacement more on the principle of the lever pessary, in prolapsus of the vagina and uterus they act entirely by their size and have a mere retaining power. The bulk of the tampon, in fact, secures its retention; a small tampon would be of no use whatever, as it would be forced out on the first expulsive motion. These large tampons need therefore only to be pushed into the vagina as far up as they can be crowded, and usually require to be guarded against expulsion by intra-abdominal pressure by a broad T-bandage. The tampon in these relaxed conditions of the vagina and uterine supports merely takes the place of a pessary, the majority of which instruments are either too small or too weak to retain the uterus during the forcible expulsive efforts made in walking, lifting (which the women suffering from these affections are generally obliged by poverty to do), and defecation; or too large, and give pain or cause excoriation and ulceration of the vagina. But these cotton pessaries possess two great advantages for the treatment of prolapsus vaginæ et uteri over permanent mechanical supporters, and these are: 1, their cheapness, and 2, the possibility of impregnating them with astringent substances which contract the vaginal walls and ultimately (except in senile atrophy) restore their tonicity to a greater or lesser extent, and fit them for a permanent supporter. Such an astringent is pre-eminently the finely powdered tannin, so frequently spoken of in these pages. Such tampons may have to be renewed daily for months, at least; but they will not fail to secure decided improvement in moderately new, and certainly temporary relief (so long as used) in old cases. I have met with many cases of total procidentia in which none of the complicated and expensive contrivances supplied by the instrument-makers retained the organ properly or at least painlessly and without injury, but I have still to see the case in which the large tannated cotton tampon supported by a T-bandage failed to achieve this result without injury or pain. An objection to it certainly is that, to be properly applied and to do the most good, it must be introduced through a speculum and tightly packed by a physician. But this objection will really hold good only in localities where the patient has no dispensaries to visit every day or other day; in cities, no poor patient has this excuse, certainly not in this country; and the wealthy can secure the physician's attendance as often as they are ready to remunerate him. And even for the poor who have no charitable institution at their command, as in country districts, this method is available, because they can, after a fashion, apply the tampons themselves, as I shall presently show.

I have already stated, that the large tampon is best applied in these cases, through a speculum, which may be the largest size of cylindrical or a bi- or tri-valve, but is always preferably the Sims. If a tubular, or plurivalve speculum is used, the tampon must be crowded in sidewise, so as not to become blocked at the mouth; if the Sims is employed, the largest sized tampon may be easily laid exactly where it is wanted.

These medicated astringent tampons are especially useful and curative in subinvolution and prolapse of the anterior or posterior vaginal wall, so-called cystocele or rectocele, in which the astringent is vastly more effectual in restoring the natural tonicity of the parts than in old prolapsus uteri. Pessaries, even the latest and most efficient, that of Gehrung, do not act as curative means, they are merely retentive agents. That portion of the tampon which is to be placed in contact with the subinvoluted or prolapsed part is most heavily saturated with the astringent, which may even be powdered on that spot, and the tampon is therefore best placed through the Sims, whereby most perfect adaptation is secured and none of the ingredients are expressed or wiped off. I have had such good success with these tampons, in rectocele particularly, as to look upon them as curative when the prolapse is complicated with fresh subinvolution of the vaginal wall. In one case of aggravated rectocele, within six months after confinement, I relieved the urgent distress by tannated tampons daily applied, telling the lady that it would be necessary for her complete cure to operate on and sew up the perineum which was lacerated to the sphincter during her first labor fifteen years before. As the hot weather was approaching I decided to defer the operation till the fall, and instructed her in the use of the tampons while she was away in the country. When I saw her again in the autumn, to my surprise the rectocele had entirely disappeared, and to this day, five years later, has not reappeared. The tannin tampons thus deprived me of a very lucrative and probably creditable operation.

I have spoken of the necessity for the physician's introducing these tampons as an objection. There can be no question that they do vastly more good if properly packed tight by the physician; but in inveterate cases of total procidentia even the incomplete painless retention of the prolapsed mass is regarded as a boon, and the means by which this can be attained are joyfully hailed by the patient. I have had a large experience with this remedy among the poor classes, and have always found that the patient herself, if she be possessed of the ordinary amount of intelligence, can readily be taught to introduce the tampon. The vaginal orifice is generally exceedingly patulous, by reason of the lacerated perineum and prolapsed vaginal walls, and a tampon of considerable size (as large as a duck's or even a goose's egg) can be pushed into the canal by the patient herself. In poor patients this possibility is a great advantage, not to be underestimated in those frequent cases where no permanent supporter can be borne. I show the women the size and shape of the tampon, indeed generally give them one as a sample, tell them to smear its surface completely with lard or dip it in olive-oil or glycerine, and then roll it in the astringent powder, generally tannin, which they will get by prescription at the druggist's. Then, lying on the back with thighs flexed and separated, they draw apart the labia with the fingers of one hand and steadily crowd the tampon into the vagina with the other, care being taken to leave the string by which it is to be withdrawn protruding from the vulva. Such a tampon should be renewed every twenty-four hours, the vagina being first cleansed by tepid injections. The tough, epidermoid mucosa of old prolapsed vaginæ bears this astringent treatment for months without becoming excoriated by the tannin and pressure; if, however, the epithelium begins to show signs of exfoliation, or if the vagina is tender, as in simple rectocele or cystocele, the tampon should be soaked in a solution of tannin in glycerine 1: 4 or 6, and squeezed nearly dry before being introduced. When well crowded into place, the tampon should always be retained by a broad T-bandage covered by oiled-silk where it rests against the vulva. These tampons can be worn for months, each daily reapplication being preceded by a cleansing injection. It is well to omit the astringent occasionally and apply merely a glycerated or vaselined tampon, in order to avoid producing excoriation of the vaginal mucosa, or to alternate day by day with the astringent and emollient tampon.

4. *As a mechanical support and stimulus to the pelvic vessels, and as an alterative to the pelvic tissues by means of the direct pressure it exerts on them.*—In many cases the vessels of the pelvic organs, chiefly the veins, are in a state of chronic passive dilatation, the result of long-continued venous hyperemia. This hyperemia may be due to obstructions to the venous circulation in distant organs (as in congestion of liver and portal circulation, or cardiac disease), or more frequently at least, in the class of cases met with by the gynecologist, to subacute and chronic inflammatory conditions of the pelvic organs (uterus, ovaries, and cellular tissue) themselves. The interruption to the circulation by intrapelvic exudations of lymph and the cicatricial contractions and adhesions resulting therefrom, is also a not unfrequent factor in this passive hyperemia. In such cases the pelvic tissues accessible to the touch, vulva, vagina (chiefly the upper portions), uterus and para-uterine cellular tissue, impart a puffy, doughy, sensation to the examining finger, similar to that afforded by edema in external parts. The vagina is generally relaxed, the uterus more or less displaced and enlarged, the ovaries tender and swollen; and the parametrium, chiefly laterally and behind, exceedingly sensitive to touch. This last is particularly the case when there has been some, often entirely latent and unsuspected, pelvic cellulitis.

Such patients complain of backache, weight and fulness in the pelvis, and bearing down. They are generally very much benefited by rest in bed and hot water injections, the former of which remedies obviously only the better classes or hospital patients can sufficiently employ. As a substitute for this rest and as a support to the distended blood-vessels the tamponade of the vagina has been successfully employed. This method was first systematically described in print by Dr. V. H. Taliaferro, of Atlanta, Georgia, in 1878, but Dr. Nathan Bozeman, of New York, claims to have used it many years previously. According to Dr. Taliaferro (whose description I follow, as it was from him I first learned the details of the practice), the solid packing of the vagina with cotton and wool is an excellent remedy in subinvolution, areolar hyperplasia, descensus and other dislocations of the uterus, chronic pelvic peritonitis and cellulitis, adhesions (and I would add), chronic ovaritis—conditions in which painting with tincture of iodine, hot injections, glycerine tampons, etc., are the usual remedial means. .Dr. Taliaferro places the patient in the knee-breast position, which is preferable to the lateral semiprone position as a suspender of intra-abdominal pressure, and elevates the perineum with Sims' speculum. Air is thus admitted into the vagina, which is expanded like a balloon. A few, two or three, pledgets of cotton soaked in glycerine and squeezed dry, are then packed into the fornix vaginæ with long dressing-forceps, and the remainder of the vagina is then filled with tightly packed loose balls of dry, finely carded sheep's wool, down to the floor of the pelvis. This packing should be done gently and carefully, but firmly, and the tampon should not reach to the vulva, or it might interfere with micturition and defecation, and give pain by its size. The sheep's wool should be carbolized and is preferable to cotton on account of its elasticity. This tampon is to be renewed every two to three days. The annoying sacral and pelvic pains, and the feeling of dragging and bearing down, almost constantly met with in these cases, are said to disappear almost wholly after the first tamponade. The patients are not obliged to remain in bed, unless they prefer to do so. Any abrasions produced by the pressure in the vagina may require the interruption of the tampons for several days, or the wounds may be covered with linen strips smeared with vaseline. The tampons should in any case be applied loosely at first, and be gradually tightened. According to Taliaferro this dilatation does not relax the normal vagina, and dilated vaginæ are incited to contraction by it. The cases reported by him are certainly striking examples of the good effects of this treatment, one uterus having been reduced from three and a-half to two, another from six to three inches, after two to four months' treatment. In one case an annoying gastric hystero-neurosis, with vomiting, was entirely cured by the local pressure. The therapeutical action of the tampon is said to be the following: The pressure diminishes, 1, the blood-supply and nutrition; 2, it increases absorption; 3, it destroys hyperplastic tissue by retrograde metamorphosis; 4, it diminishes nerve-activity; 5, it rectifies displacements. The following, according to Taliaferro, are the advantages of this method: 1. More rapid effect. 2. The patients are not confined to their beds by it; on the contrary the support of the tampon affords them relief and enables them to walk about, while the ordinary measures (caustics, sponge-tents, etc., necessitate a more or less prolonged rest). 3. The entire prevention of sexual intercourse, a therapeutic auxiliary but seldom observed. 4. Absence of all inflammatory irritation. 5. Softening and dilatation of the tissues, while caustics and curettes toughen them. 6. Absence of destruction and removal of parts, whereby their integral condition is retained.

I have thus far quoted Taliaferro's description in abstract, but am able to coincide with him from a quite extensive experience with his method. I have repeatedly found this solid column of cotton (I have always employed cotton only, not having the wool at hand) to be the only means of relief from the harassing backache in adhesion of a hyperplastic retroverted uterus, and have, after a few applications, toughened the parts so much as to permit the pressure of a pessary on the then partly replaced fundus. Of the value of this steady elastic pressure and support in reducing the size of an engorged hyperplastic or (better still) subinvoluted uterus, and restoring the normal circulation to the edematous and congested pelvic cellular tissue, I have no doubt whatever; neither of the potent alterative effect of this pressure on old peritonitic or cellulitic exudations and adhesions. I have to add to Taliaferro's description merely, that it will usually be well to keep patients at rest for twenty-four hours after the first tampon, since I have met with many complaints from the pressure before the vagina has become accustomed to the distention and the sensitive parts to the pressure. One other condition in which I have employed the tampon with benefit, is a certain form of pachy-vaginitis, where the vaginal walls appeared thickened, edematous perhaps, and the surface is granular and rough (granular vaginitis). The pressure here, aided by the astringent effect of an aqueous solution of tannin in which the tampons are soaked, seems to have effected a cure more rapidly than the applications of solution of nitrate of silver and astringents ordinarily employed. The firm tampons cannot, however, be continued very long, as the vaginal surface will become rapidly abraded after a few applications, and the emollient pledgets must be substituted for the solid column.

Dr. M. A. Pallen, of New York, aims to attain the same object, as he claims, more effectually, by filling the vagina with wet clay formed by mixing the peculiar brick-clay dust of St. Louis with water. A thick paste made of this is packed into the vagina, the patient being in the knee-breast position, and solidifying, of course prevents motion of the uterus in any direction. Dr. Pallen calls this application his "clay pessary," and the "utero-vaginal rest" secured by it is said to be all-important in the treatment of obstinate displacements, especially if complicated by subacute cellulitis and edema of the pelvic organs. The clay is removed after from twenty-four to forty-eight hours.

5. *As a means of dilating or separating the vaginal walls—a substitute for a hard or distensible dilator—in constriction of the vaginal canal after operation for vaginal atresia or stenosis, in vaginismus and spasm of the levator ani muscle.*—The heading expresses the indications, and, to a certain extent, the method for the application of cotton pledgets in the conditions there enumerated. When it is desired to separate the vaginal walls after an operation for stenosis or atresia, or when the spasmodic contraction of the levator ani and perineal muscles prevents sexual intercourse, a hard rubber or glass plug is generally introduced and retained as long as required. In the absence of such a plug, the vaginal walls may be separated, and the spasmodic muscular contraction overcome by dilating the canal with pledgets of cotton smeared with vaseline or soaked in glycerine, and packed in one after the other through a speculum, which, is immaterial. The number of tampons will depend upon the amount of distention required; they will not be retained longer than twenty-four hours.

6. *As a hemostatic, by its mechanical pressure and size.*—There were various methods of tamponing the vagina for uterine hemorrhage before the introduction of Sims' speculum, such as, 1, the crowding of as many pledgets of cotton, with strings attached, into the vagina through a cylindrical or plurivalve speculum, as the vagina would hold; 2, the passage of a greased handkerchief or conical bag into the vagina over a speculum, and the filling of the bag to the mouth with pledgets of cotton; the speculum was then withdrawn, and the tampon removed in due time by pulling on the bag or ends of the handkerchief projecting from the vagina; 3, the roller-bandage, pushed up through or without a speculum, and removed by drawing on its projecting end. All these three methods, to a certain small extent, fulfil their purpose, at least, in so far that for a time the blood finds an obstacle, and coagulation is induced, until, generally in a few hours, the cotton becomes thoroughly saturated and the hemorrhage recommences. And it cannot well be otherwise, for the loosely distributed balls of cotton, in a dilatable canal like the vagina, and in the roomy vaginal fornix, exercise almost no pressure on the source whence comes the blood, the cervical canal and external os, and therefore utterly fail in the object for which they were introduced, mechanical obstruction to the flow of blood from the uterus. All the good these loose cotton tampons do is for a time to arrest or mitigate the hemorrhage by entangling the blood in their meshes and favoring coagulation. But this benefit is but temporary, and a speedy renewal of the tampon is required with the same result, until, finally, other remedies arrest the flow, or nature takes the matter in hand and removes its cause, by expelling the ovum, or placenta, or polypus, whichever the case may

be; or, finally, the patient succumbs. The addition of astringents to the tampons only renders their removal more difficult by constricting the vagina, but does not arrest the hemorrhage since the bleeding spot is not touched by the styptic. The tampons enclosed in a handkerchief or bag possess the advantage of being more easily removed, and the bag, if thoroughly distended, may exert a more steady pressure on the cervix than the loosely scattered tampons; but this advantage is slight. A better hemostatic than either is the roller-bandage, and probably better still, Foster's lamp-wicking tampon, already described, for both these tampons are in one piece, they are tightly packed, the wicking especially is very porous, and by its absorption of blood will form a pretty solid obstacle to further oozing. Other species of tampons, the dilatable rubber bags, so-called colpeurynters, certainly are useful and efficient in cases chiefly where the vagina is very distensible as during pregnancy; and I have found a colpeurynter distended to its utmost with cold water, not only the most convenient, but also the most efficient means of controlling hemorrhage and dilating the os in placenta previa. But for the non-puerperal condition they are generally inadmissible, because the amount of distention which they require to make them actually hemostatic is not long borne by the patient.

The loosely packed tampons, as above described, are still generally employed as hemostatics, and a large majority of the profession are yet ignorant of the only sure and efficient method of tamponing the vagina for uterine hemorrhage, namely, in Sims' position through his speculum. Only when that instrument is not at hand, and the fingers cannot be used as a substitute through rigidity of the perineum or vagina, is the practitioner (the general practitioner, even) justified in trifling with his patient's health and life by resorting to the almost useless tamponing of the vagina through a cylindrical or plurivalve speculum in a case where the hemorrhage is so severe as to call for a tampon at all. Every practitioner who takes and is liable to meet with cases of uterine hemorrhage (and what general practitioner is not?) from miscarriage, fibroids, polypi, polypoid endometritis, cancer, should not only possess a Sims speculum, but know how to use it and how to tampon the vagina so securely that not a drop can escape so long as the tampon is retained. It is time that the old "let well enough alone" excuse be denounced, and that the eminent old-fashioned practitioner who "never lost a case" and "never had occasion to sew up a lacerated perineum in a practice of twenty-five years," be convinced that not everything is good because it is old and he has "always done it and succeeded well with it," and that the only proper way to apply a hemostatic vaginal tampon is in the manner about to be described. To Sims and his pupil, T. Addis Emmet, belongs the priority of this method.

The patient (with empty rectum and bladder) occupies the left lateral prone position; Sims' speculum is introduced and the cervix exposed. All coagula and fluid blood having been carefully removed by the dressing-forceps and damp cotton, a disk-shaped tampon about two inches in diameter and one-half inch thick, is placed over the cervix. Another such tampon is rolled up and placed behind, another in front, and one on each side of the cervix, and a large flat one again over all these. These tampons are recommended by Emmet to be soaked in a saturated solution of alum and squeezed nearly dry. I always carbolize the tampons in a one per cent. solution, but think the alum solution a very good plan, as it contracts the vaginal pouch and thereby compresses the cervix. Occasionally it may be necessary to push a pledget of alum cotton into the cervical canal and thus arrest the hemorrhage until the whole tampon has been firmly placed. The oozing of blood between the layers of cotton hastens their offensiveness.

The first circle and layer of tampons having been arranged, as described, and the vaginal vault thus filled and the cervix compressed in all directions, disk after disk of dampened carbolized cotton (I do not think it necessary to alum these lower layers) is laid around the circle of the vagina, filling up the centre at the last, and each disk and each layer is gently but firmly pressed down and packed tight with the dressing-forceps or a whalebone stick. This pressure should always be made from the periphery toward the centre, or rather from the anterior vaginal wall toward the sacrum. As the cotton is thus welded and pushed up, the room thus made is filled by new pledgets, until the vagina is distended to its utmost and the tampon has reached not only the floor of the pelvis, but is parallel with the pubic arch. After a final thorough survey of the tampon and packing down of any loose part, the dressing-forceps hold back the cotton firmly with widespread blades, and the speculum is carefully dislodged and removed with point backward. Considerable care is required not to dislodge the tampon in this maneuvre, and it is necessary after removal of the speculum to fill the space thus made by a fresh packing tight of the whole tampon, and perhaps by several additional disks. I always introduce two fingers and touch the surface of the tampon before considering the work done; in this way I am able to detect any imperfection in the packing, and remedy it by direct pressure. The whole process can be likened to nothing better than to the filling of a carious tooth with dry, soft pellets of gold-leaf. When the vagina is thus tamponed, there is absolutely no chance for blood to ooze through, and only after twenty-four hours or longer may the cotton gradually become soaked with the bloody secretion from the uterus and a slight oozing from the vagina appear. But this is not hemorrhage—merely a sign that that particular tampon has done its duty and should be removed.

This tampon should not be retained longer than twenty-four hours. It becomes more or less offensive by that time, even when thoroughly carbolized; besides, it is so easily replaced that it is better not to allow it to remain too long. While the vagina is distended by the tampon the bowels should not, and generally cannot, be moved because of the obstruction of the rectum; if moved, the tampon may be displaced and the hemorrhage recommence. When the tampon has been removed, an enema may be given; or a laxative may have been taken beforehand, and the tampon is removed when its action is imminent. If the tampon is very large the bladder may require emptying by the catheter. Or, if the tampon has been placed so far down, its pressure on the neck of the bladder and urethra may give rise to pain and tenesmus; in that case, the patient is placed in the dorso-gluteal position, and a small portion of the tampon, next to the urethra, removed with forceps or notched steel tampon screw. The removal of the tampon is an easy matter after the speculum has once

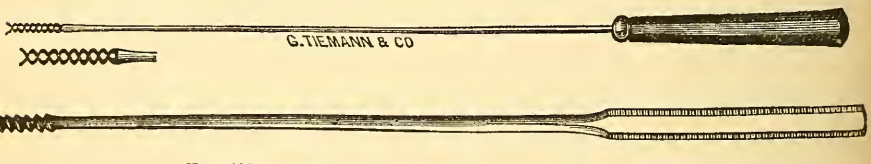


FIG. 126.—Sims' tampon extractor, with closed and open screw.

been introduced. It is possible to remove the cotton without a speculum by guiding the tampon-extractor into the vagina, screwing it into the cotton, and removing piece by piece. But the farther it is necessary to reach into the vagina the more irksome does this process become, and I am therefore in the habit of introducing the speculum and removing all the cotton through it. The at first compact mass of cotton, which reached from side to side of the pelvic cavity, has become somewhat loosened by the utero-vaginal secretions, and it is not a difficult, although a delicate, task to introduce the blade of the Sims behind the tampon along the recto-vaginal wall. At first the speculum should be introduced only a short distance, and as the cotton is removed, passed up to its full length. If there is any difficulty, the first layers of cotton may be removed without a speculum, and the latter introduced as soon as room is made. Layer after layer of cotton is thus removed with the dressing-forceps until the vagina is emptied. A hot carbolized injection is then given, and if there is still hemorrhage the tampon is reapplied in the same manner. If the flow is slight, the tampon need not be so large, and the pledgets may be soaked in glycerine and water, which will soothe the vaginal walls heated by the astringent cotton.

By means of a tampon applied in this manner every uterine hemorrhage can be controlled, except perhaps during labor, when I think a colpeurynter or Barnes' dilator preferable. In inevitable abortion, or uterine fibroid or polypus, the hemorrhage will not only be controlled by the tampon, but the external os dilated and the cervix shortened by its pressure, and the diagnosis (if necessary) and radical treatment thus facilitated. In conjunction with these tampons, intra-uterine treatment for the final cure of the hemorrhage may be employed.

The difference between this method of tamponing the vagina and the employment of a column of tampons as supports to the uterus and pelvic vessels is only one of degree, the hemostatic tampon being much larger than the supporting or dilating tampon.

8. *As an absorbent of vaginal and uterine discharges and a protective to the sound parts from caustic substances applied to uterus or cervix.*— The object in introducing cotton into the vagina to absorb discharges from that canal or the uterine cavity, is to prevent these discharges from infecting, excoriating, or soiling the parts below, whether the epidermis of these parts be intact or abraded. Thus, in cancer of the cervix, or profuse discharge from the endometrium and endotrachelium in catarrhal inflammation of these parts, or in acute or chronic vaginal leucorrhea, tampons —best of absorbent cotton—are introduced into the vagina to catch the secretion and prevent it from escaping and excoriating the labia and adjacent parts, and soiling the linen. Such tampons are applied in the ordinary manner, disinfected, if necessary, their size should correspond to the capacity of the vagina and the frequency of their renewal to the amount and character of the discharge. As with every other variety of vaginal tampon the vagina should be thoroughly cleansed of débris of detached epithelium and coagulated mucus and blood by copious injections immediately after the removal of the tampon and before the introduction of a fresh one.

The tampons are applied through either of the forms of specula, as already described, perhaps quite as easily and effectually through the cylinder as through either of the others.

It is by no means an unimportant matter to protect the labia, vulva, and thighs from excoriation by acrid vaginal discharges, which is particularly liable to occur even from an ordinary leucorrheal flow, in stout women, especially in warm weather. The usual astringent vaginal injections do not suffice for this purpose; indeed, the very frequency with which they are required to be made, aids in increasing the tenderness of the vulvo-vaginal orifice. An absorbent tampon, previously saturated with an astringent and then dried, answers an excellent purpose in these cases.

It may be mentioned casually that an excellent application for excoriated thighs (acute intertrigo of the inguinal furrow and the cleft between thighs and genital organs) is the ordinary lead or diachylon plaster, *freshly prepared*, spread on English lint or linen and reapplied two or three times daily. This acts not only as a protective, but as a healing agent. Tampons introduced as absorbents of profuse utero-vaginal discharges should be renewed at least every twelve hours.

Prof. B. S. Schultze, of Jena, uses the tampon as a means of diagnosing an endometritis. He states that the usual signs given in the books (tenderness of fundus on sounding, profuse serous discharge, supra-pubic pain, etc.) are vague, wherein no doubt he is correct; and claims that the presence of pus oozing from the uterus is the only certain evidence of the presence of endometritis. To detect this pus and distinguish it from the secretions of the cervical and vaginal canals, Schultze employs a glycerine tampon of absorbent cotton, the surface of which is coated with a twenty-five per cent. solution of glycerole of tannin. This tampon is placed against the cervix through a speculum, the vaginal vault having first been thoroughly cleansed, and when removed after twenty-four hours the coagulated secretion of the uterus will be found on the tampon exactly opposite to the os uteri. The cohesion between tampon and vaginal walls and surface of cervix is rendered so close by the contraction of the tannin that no uterine secretion can ooze past the tampon, and the glycerine attracts the watery secretions. On the tampon there will be found a small lump of coagulated uterine secretion; if normal it is of glutinous appearance, transparent or but slightly opaque, perhaps tinged violet by the tannin; if purulent, the color is entirely different, opaque, yellow, or greenish. The difference between pus from the uterine cavity proper, and pus from the cervix, is that the cervical pus is intimately blended with the peculiar tenacious secretion of that cavity, but the uterine pus is more or less distinct. This purulent secretion may not be constant, indeed it is more common and profuse immediately before or after the menstrual period, or it may be retained a few days and then be discharged in one gush. Repeated examinations with the tannin tampon should therefore be made before deciding the diagnosis.

VI. Applications to the Endometrium.

The application of medicinal agents to the mucous lining of the uterine canal is naturally divided by anatomical and practical conditions into two sections: 1. Applications to the mucous membrane lining the cavity of the cervix, below the internal os, and 2, applications to the mucous membrane of the uterine cavity proper.

1. *Applications to the Cavity of the Cervix.*

The chief points of difference between topical applications to the cavity of the cervix and to the uterine cavity proper, are the greater accessibility and tolerance of the former cavity. While any instrument or medicinal agent introduced through the internal os may set up violent neuralgic or inflammatory action in the uterus or its adnexa (as has already been stated in speaking of the use of the sound), the cervical canal is ordinarily very little susceptible to even the most severe treatment. The peculiar formation of the endocervical mucous membrane, and the comparatively isolated position of the cervix (so far as the contiguity of the peritoneum and large lymphatic plexuses situated between the broad ligaments is concerned), are probably the reasons of this tolerance. The mucous membrane is composed of numerous racemose glands or follicles which, arranged in ridges and furnished with an abundance of fibro-cellular substratum, become still more dense and tough when they have been subjected to the continued irritation of a catarrhal inflammation. And this is the very condition when applications to the cervix are most needed and performed.

The *indications*, therefore, for applications to the cervical cavity are such conditions in which there is an inflammation, generally subacute or chronic, of the mucous membrane of the cavity, with more or less hypersecretion of the stringy, ropy mucus peculiar to that location. The various grades of this affection are comprised in the common term of "endocervicitis," for which hybrid word, that of "endotrachelitis" (*endo*, within, and *trachelos*, the neck) might well be substituted. They are all characterized by the profuse stringy discharge already referred to, which may be either translucent or discolored, accordingly as there is merely a hypersecretion or an actual inflammation with loss of epithelium and suppuration. If this discharge has existed for any length of time, the lips of the os are eroded (not *ulcerated*, since there is only a loss of the epithelium, no actual loss of substance), and this erosion may after a time be accompanied by a hypertrophy of the papillæ of the mucous covering of the cervix (papillary erosion); or the follicles may become occluded, distended, and project from the cervix, forming the "ovula Nabothi," or they may dot the surface of the everted, red secreting endotrachelium as small translucent specks (follicular erosion or cystic hyperplasia). When an endotrachelitis has existed for some time, the external os generally gapes, the lips roll out and the eroded, thickened endotrachelian mucous membrane appears to view, closely simulating true ulceration and, of course, increasing the circular erosion of the lips already spoken of. (Fig. 127.) From this gaping, eroded opening usually hangs a thick plug of cloudy, stringy mucus, which resists all attempts at removal by forceps and cotton, and has to be drawn and broken away, as it were, by force with a dry sponge on a holder, or sucked up by a syringe. This, then, is the class of cases in which local applications are required and, indeed, indispensable to a cure.

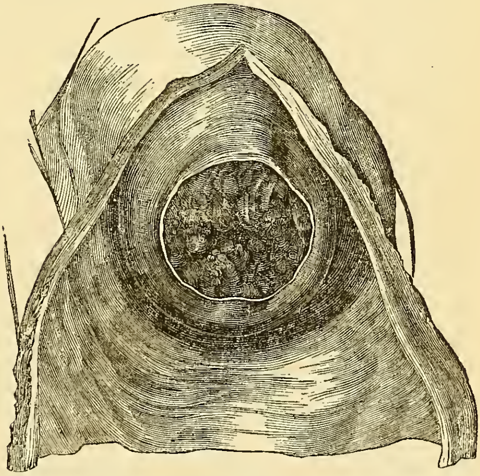


FIG. 127.—Circular eversion of mucous membrane of cervical canal in a subinvoluted uterus, simulating ulceration. (Barnes.)

A fissure or laceration often precedes, indeed causes, this eversion (or ectropium, as it is also called), and the endotrachelitis is but a secondary affair, the result of the laceration. In such cases it is usually indispensable to a permanent cure after having reduced the catarrh and hyperplasia of the cervical mucous membrane, to close the laceration by an operation first devised and practised by Emmet, and now become deservedly popular as one of the greatest achievements of modern gynecological surgery. Besides parturition, the common causes of endotrachelitis are exposure to cold, excessive coition, masturbation, and uterine displacements; in fact, everything which produces chronic pelvic congestion. It is a matter of experience that such catarrhal affections of the cervix, complicated by eversion or not, do not recover under mild applications by means of astringent injections, or even with hot water irrigation. While the latter undoubtedly relieves the congestion and prepares the way for a cure, stronger topical agents are needed to remove the thickened mucous membrane and set up fresh healthy action in the tissues.

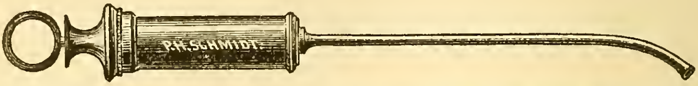


FIG. 128.—Cervical mucus syringe. A piece of rubber tubing slipped over the nozzle of this syringe often answers very well to draw tenacious mucus from the cervical canal.

A frequent indication for topical applications to the cervix is the spread of malignant disease up from the external os; but such applications require to be of the most powerful agents.

In areolar hyperplasia of the uterus, particularly if the cervix shares to a marked degree in the enlargement, the introduction of alteratives into the cervical cavity may aid in the resolution of the hyperplastic tissue, but such applications would be restricted to cases in which the more efficient introduction of the agent into the uterine cavity proper is inadmissible.

Agents.—To be of any service in the chronic, notoriously intractable catarrh of the cervical cavity, applications must be thorough and powerful. Whatever, therefore, can safely be applied to the outer surface of the vaginal portion of the cervix, may (with somewhat less safety, but still properly) be used in the cervical canal. But the internal os should (except in the cases hereafter to be specified) always be regarded as the limit of such powerful measures.

We may thus apply the fuming nitric, pure carbolic or chromic acid to the cervical cavity; or the solid stick of nitrate of silver; or, if we desire to produce a decided slough, as in malignant disease, the saturated solution of chloride of zinc (as described under applications to the cervix) or the caustic potash or solution of pernitrate of mercury, or, what is often better still, the actual cautery. But it is all-important to remember that the sloughs of all the substances named, from the nitric acid to the nitrate of mercury (excepting only the pure carbolic), produce cicatricial contraction, and that they should therefore not be applied to a cervical canal unless such contraction is desired. A mere superficial application, however, will produce no slough and no contraction, especially if nitric acid is used. This agent, therefore, is a very useful remedy in chronic endotrachelitis, characterized by hypersecretion and enlarged follicles. Another excellent application in this affection is the iodized phenol (tincture iodine and pure carbolic acid, equal parts) which may be applied every other day or oftener, until the cervical cavity assumes a more healthy appearance. When this occurs, no matter what the agent used, a milder application, such as plain tincture iodine, tannin and glycerine (equal parts), or tannin in powder, or iodoform and tannin, or the pencil of sulphate of copper or zinc, or what is best of all, a solution of nitrate of silver (ʒ ss. to ʒ j. to ℥ j. of water) should be applied every two or three days until healthy epithelium covers the eroded mucous membrane.

When the tough mucous membrane and enlarged glands resist even the strong escharotics first mentioned, we might resort to the last two in the list of strong agents—the acid pernitrate of mercury and the caustic potash (potassa fusa, or potassa cum calce, which latter is mixed with lime and is preferable because it is not so powerfully caustic and does not diffuse). But the effect of these two diffusible agents is not so easily controlled, and we cannot tell whether the slough produced and the cicatricial contraction ensuing may not largely exceed safety and our wishes.

A far safer and also, I think, more efficient escharotic is the actual cautery, applied either as a hot iron, or the dull red platinum tip of a galvano-caustic battery or the thermo-cautery. Its application is instantaneous, not painful, and the slough formed is not too deep if the heat was not too intent and its contact too thorough. In the cervical cavity this application is generally perfectly safe; beyond the internal os, however, its use becomes decidedly hazardous. Should this agent fail, or should it appear desirable to remove the hyperplastic follicles more rapidly, and at the same time stimulate the mucous membrane thoroughly, we may do so with an instrument which we have entirely under control, namely, the sharp cutting curette of Sims (see chapter on Curetting). With it the hyperplastic tissue is removed with ease, rapidity, safety, and comparative absence of pain. It is well to paint over the fresh surface with tincture iodine or sol. arg. nit. immediately after the curetting. Sims says that without the sharp curette he would despair of curing very many cases of chronic endotrachelitis. If thoroughly done, the curetting will not require repetition.

In a large proportion of cases, almost exclusively in single or sterile women, the endotrachelian catarrh (and, *post hoc* and *propter hoc*, the sterility) is due to a narrow, external os, which prevents the free discharge of the normal cervical secretion. The pent-up discharge gradually becomes acrid, irritates the cervical mucosa, which pours forth a fresh supply; this increases the irritation, until we finally have a decided catarrhal inflammation of the cervical canal and a dilatation of its follicles. It will give but temporary relief to remove the retained discharge with a cervical syringe or cotton-wrapped stick. Indeed, the viscid, tenacious, discolored (yellowish or reddish) mucus frequently resists all efforts for its removal. The curette cannot be introduced through the narrow os, and even if the follicles were scraped away the disease would return, because the primary exciting cause, the constricted external orifice still exists. We must, therefore, begin the treatment by enlarging this orifice, and this may be done either with the dilator or the knife. When a thick plug of mucus is seen hanging from the external os, or the removal of the sound from the uterine cavity is followed by a gush of viscid mucus which has been liberated by that instrument, we can generally assume that the case is one of retention of endotrachelian secretion, and that our first step should be to give that secretion a free outlet. The condition in such cases is explained by the accompanying cut, which shows a long cervix with narrow external orifice and its cavity dilated by the accumulated secretion, the viscidity of which prevents its flowing through the small outlet, as a fluid discharge probably would. I have frequently procured the expulsion of this accumulation in a gush by pressing on the posterior surface of the cervix with the finger or depressor. The indication in such cases is to dilate or incise the external os sufficiently to permit the free escape of the secretion. A dilatation will doubtless suffice for temporary relief, but the orifice will certainly contract again unless the dilatation is frequently repeated. We should remember that applications to the cervix will probably be needed for some time, and that patency of the cavity is desirable for that purpose; farther, that it is not only the endotrachelitis which we must cure, but also the sterility so generally accompanying the catarrh. We must not only remove and prevent the re-formation of the acrid, tenacious mucus, which prevented the spermatozoa from passing into and through the cervical canal, but we must also keep the door sufficiently open to give them free admission. We must, therefore, secure permanent patency of the external os, and this is best attained by a combination of the two methods, the knife and dilatation. I should advise, first to incise the lips of the external os, not bilaterally only, but quadrilaterally—make what is known as a crucial incision, and make it so deep as to open the external os nearly or quite to the size of the dilated cervical canal (as shown by the dotted lines in the cut, Fig. 129). The particulars of this little operation are given in the section on Dilatation of the Uterus by Incision.

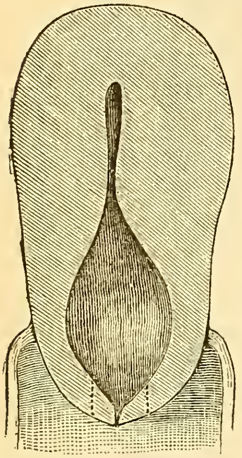


FIG. 129.—Dilatation of cervical cavity and retention of mucus in endotrachelitis by narrow external os. Dotted lines show incisions. (P. F. M.)

The division of the external os should be followed by the tamponade of the cervix with cotton plugs introduced on the slide-applicator, (see Figs. 134 and 135), which may, after a few days, be soaked in some medicinal agent, such as tincture of iodine, iodized phenol, or carbolic acid, until the catarrh is cured.

The cure of an endotrachelitis of long-standing is always a matter of several weeks, perhaps even months. A speedy recovery should, therefore, not be promised, although the hope of a sure cure may generally be held out. It is well to bear in mind that pregnancy increases the hypersecretion from the endotrachelium, especially if the cervix is lacerated and everted, and that no treatment but *very* mild local astringents in injections should be used until after delivery. The small operation just described, as well as all applications to the endotrachelian cavity, are best performed through a Sims speculum—that is understood. Still, a large tubular or bivalve might answer very well.

Counter-indications and dangers.—The *counter-indications* to the application of caustics, or the curette to the cervical cavity, are always (besides the invariable one of pregnancy) the presence of acute or subacute inflammation of the uterus or its adnexa. The *dangers* are the rekindling of such inflammation, if it once existed, or of producing it for the first time, if the patient happens to be in a susceptible condition. Thus, in a case of operation for laceration of the cervix last summer, in which a small cervico-vaginal fistula remained at the angle of the laceration, the remainder of the rent having fully united, the cauterization of the fistulous track with the stick of nitrate of silver resulted in a circumscribed pelvic cellulitis of the size of half a lemon in the supra-vaginal cellular tissue immediately adjoining the fistula. This exudation disappeared in two weeks and the fistula then proved to be healed. There are the same counter-indications to, and the same dangers from, any application to the uterus. A careful examination, and perhaps previous experience with the case will enable the physician to judge whether his patient is likely to bear local treatment well.

The *precautions* to be employed will, therefore, depend upon the exigencies of each case. Still, the general rule should be observed, not to apply any caustic agent so thoroughly as to cause a mutilation of the cervix by the slough it produces, therefore to be careful to apply such caustics as are followed by cicatricial contraction (nitric acid, chromic acid, solid nitrate of silver, acid nitrate of mercury) only to a cervical canal which is larger than it should be, and which will permit such contraction without injury to the future health of the patient. Nitric acid, when deeply applied, will cause a slough; but if touched but lightly on an abraded surface produces merely a superficial film of albuminate and acts more as a stimulant than a caustic. We should therefore apply it thoroughly only when we wish to destroy tissue and produce cicatricial contraction. By bearing this rule in mind, the frequent cases of stenosis of the cervical canal and external os will be avoided which are met with by gynecologists as the result of the careless application of nitric acid. The same applies quite as much to the solid nitrate of silver.

Methods.—Whichever speculum will thoroughly expose the cervical canal and permit the introduction of an applicator or curette into it will answer for the purpose of endotrachelian medication. The nitrate of silver or sulphate of copper stick is applied by a long caustic holder or in a quill, or held by long dressing-forceps; the chromic, carbolic, and nitric acids and nitrate of mercury on a glass or wooden rod. The wood soaks up the fluid and prevents its dropping, and is therefore rather preferable to the glass. The iodine, iodized phenol, etc., are best applied by a brush or cotton-wrapped screw-stick, which, of course, can be equally well used for the other agents if care is taken to carefully wipe off all excess from the cotton. As in making applications to the surface of the cervix, the vagina should be protected from any excess of the fluid by packing a layer of cotton wadding under the cervix, which cotton may be soaked in oil, salt-water, or a solution of bicarbonate of soda to neutralize the caustic, and is removed with the speculum.

It is well to mop up the excess of the strong caustics, before placing the usual vaseline or glycerine tampon over the cervix. But if a more thorough effect is desired from the milder alteratives and stimulants (iodine, iod. phenol), the cotton plug described above may be soaked in the agent and introduced by the slide applicator, to be removed after eighteen to twenty-four hours. The powders (iodoform, iodoform and tannin) are either thrown into the cervix by a spoon or spatula, or blown in by an insufflator, and are allowed to remain until eliminated with the vaginal secretions. If it is desired to deplete the cervix and allay irritation, a glycerine tampon should be applied; but if the effect of the application was to be astringent, a vaseline tampon is preferable. The sloughs from the strong caustics come away in from five to seven days (or more, if very deep); the albuminate formed by the milder agents disappears within two days. The time for repetition of the application varies therefore with the character and strength of the agent applied, the thoroughness of its use, and with the severity of the affection. Strong caustics require to be applied only once or twice, to be followed by the milder agents, which should be used two or three times a week as long as the case calls for them, and may need frequent changing. I have devoted so much space to the discussion of applications to the cervical canal, because catarrhal hypersecretion of that part is exceedingly common and a very frequent, often unsuspected, cause of sterility and annoying backache; further, because its treatment should be energetic to be successful, and even then is not likely to anticipate the expected period of cure.

2. *Applications to the Mucous Membrane of the Uterine Cavity Proper.*

The indications for intra-uterine applications are exceedingly simple. They may be enumerated under five heads: 1. Endometritis, or uterine catarrh, in its chronic form. 2. Hemorrhage from the cavity of the uterus. 3. Subinvolution, or areolar hyperplasia of the uterus. 4. Intra-uterine vegetations, or malignant disease. 5. Defective development, or atrophy of the uterus; amenorrhea.

1. *Chronic endometritis.*—Although Emmet ignores the existence of this disease, I confess I do not understand why there should not be a catarrhal affection of the mucous membrane of the uterine cavity as well as of all other mucous membranes in the body; and I do not see how an endosalpyngitis, which he admits as the result of venereal infection, can exist unless by direct transmission of the virus through the mucous membrane of the uterine cavity. Call it what we will, there certainly are numerous cases in which that mucous membrane is in a condition of chronic hyperemia (produced by exposure to cold, overexertion, excessive coition, repeated miscarriages, sluggish portal circulation, etc.), which hyperemia may gradually result in hypersecretion, which again produces a maceration of the intra-uterine epithelium and increased mucopurulent discharge. The diagnosis of chronic endometritis may be made either from the oozing of this mucopurulent discharge from the os (its intra-uterine origin being distinguishable from the cervical by the entire absence of the viscidity peculiar to the latter, and by the tampon test of Schultze, already described), or from unusual tenderness or bleeding of the endometrium on careful sounding, or from a conjunction of these signs together with otherwise unexplained abdominal weight and dragging pelvic pains. The occurrence of menorrhagia may confirm the diagnosis.

It is of very little avail to treat this affection when once it has become chronic by other than local means, by agents applied directly to the endometrium. The analogy between chronic, nasal, laryngeal, and uterine catarrh in this respect is perfect.

The indications for the treatment of a chronic endometritis are sufficiently explicit and numerous: the exhausting drain of the discharge, the aching, dragging pain in the lower abdomen, the constant backache, the reflex neuralgiæ, lastly, the sterility induced by the discharge and the unfavorable condition of the irritable endometrium for nidation of the ovum, all these are sufficient reasons why the disease should not be neglected. Besides, the discharge from the uterine cavity is very prone to irritate the endotrachelium and produce a hypersecretion from that part. Indeed, I dare say there are comparatively few cases of pure, uncomplicated chronic endometritis. The cases, however, in which the catarrhal affection has not spread above the internal os, are by far more common. Again, a discharge from the uterus may produce a vaginal catarrh, and so the annoyance increases.

In conjunction with remedies applied directly to the endometrium, the usual depleting measures for the pelvic organs are indicated, such as glycerine tampons, hot injections, saline laxatives; and the general health needs building up.

2. *Uterine hemorrhage.*—The causes of pathological hemorrhage from the mucous membrane of the uterus may be either constitutional (cardiac, hepatic, or renal disease, acute febrile affections, exanthemata, hemorrhagic diathesis, abdominal plethora), or local (polypoid degeneration, or hyperplasia of the uterine mucosa, fibroids of the uterus, malignant disease of the uterus, laceration of the cervix, endometritis, ovarian congestion), or a combination of both. To treat uterine hemorrhage depending on one of the above-named constitutional causes by local applications would manifestly be irrational and of but temporary benefit. And equally futile would it be to give hemostatic medicines for the arrest of a metrorrhagia caused by polypoid vegetations or cancerous disease. As regards fibroids, however, agents which cut off the blood-supply from the tumor by contracting the uterus, notably ergot, form a decided exception to this rule. But the hemorrhage from the villi of a cervical epithelioma or a hyperplastic uterine mucosa is very little affected by general hemostatics. The best results are undoubtedly obtained by combining both methods of treatment; and I am therefore in the habit of prescribing hemostatic medicines (ergot, gossypium, cannabis indica, aromatic sulphuric acid, etc.), while using local medication. A radical cure will, however, be achieved only by such treatment as removes the cause, constitutional or local, of the hemorrhage.

In making the diagnosis of uterine hemorrhage it may be well to exclude hemorrhage from the vagina or cervix (as in laceration or malignant disease of the cervix) before deciding on the proper medication; and this is done by exposing the parts with the speculum.

The effect of topical hemostatic remedies is usually a rapid one, but they may have to be frequently repeated unless the cause of the hemorrhage is at the same time removed.

3. *Subinvolution, or areolar hyperplasia of the uterus.*—An exceedingly common affection with all women who have miscarried or borne children is deficient involution of the uterus. This may depend on local factors which interfere with the proper physiological involution of all the genital organs after childbirth, such as local injuries to the uterus and adnexa (laceration of cervix or perineum, displacements of uterus), pelvic peritonitis or cellulitis, too early rising from the lying-in couch, endometritis, metritis; or it may be due to constitutional debility and want of tone. A subinvolution of the uterus, which is neglected or does not yield to remedies, does not, in my opinion, remain a *subinvolution* always; but, after a certain period, varying between several months and several years, the intermuscular cellular or areolar tissue begins to enlarge and gradually encroaches upon and compresses the formerly abnormally developed muscular fibres, the latter lose their softness and succulence, and the areolar tissue becomes dense, and at last almost fibrous; the soft subinvolution has passed into the hard *areolar hyperplasia.* In the words of Scanzoni, the father of "chronic metritis," which is identical with what we now call areolar hyperplasia, the stage of infiltration merges into that of induration. Skene calls the latter condition sclerosis of the uterus. The large majority of cases of areolar hyperplasia, in my opinion, date from a miscarriage or confinement, subinvolution, of course, being the initial stage of the affection. But rarely do I meet with a case of diffuse areolar hyperplasia of the whole uterus in a nullipara. Still, I will not deny that causes which produce and maintain a chronic congestion of the uterus

(such as repeated temperature shocks, excessive or unnatural coition, cold syringing after intercourse, unsatisfied sexual excitement) may in time produce a condition identical with areolar hyperplasia.

The local symptoms (pelvic weight, pressure, backache, dysuria, dyschezia, ovaralgia) and the constitutional signs (the various hystero-neuroses, general anemia, melancholia, etc.) present an array of ailments so distressing and persistent as to call for any means by which relief may be obtained. Among such means undoubtedly are the intra-uterine applications of stimulating, absorbent, and alterative agents. But to be of service such applications should be thorough, persistent, and frequent, far more so even than in chronic endometritis, and they should always be combined with hot-water injections, glycerine tampons, saline laxatives, and general tonics.

4. *Intra-uterine vegetations or malignant disease.*—While some gynecologists, disciples of Lombe Atthill of Dublin, still endeavor to destroy vegetations of the endometrium by the application of powerful caustics, chiefly fuming nitric acid, the majority follow the lead of Sims and Thomas, and remove the vegetations with the curette, preferably the blunt instrument of Thomas. This latter method is so much more effectual, rapid, convenient, and safe than the tedious, painful, and more or less superficial cauterization, that with us the curette has become the favorite means of treating polypoid endometritis. But cases are not unfrequently met with in which a more positive local effect seems necessary than the mere scraping of the vegetations, cases in which a deeper layer of the endometran mucosa requires to be removed than would be justifiable with the curette; and here it may be necessary to supplement the curetting by an application of fuming nitric acid, chromic acid (1 : 2), iodized phenol, or liq. ferri persulphatis. Such cases are generally those in which the hemorrhage continues or returns after the scraping, and the repeated use of the curette fails to remove additional vegetations. The ectatic and debilitated blood-vessels of the endometrium seem unable to contract, and the only means of preventing the oozing from their torn and gaping orifices is to utterly destroy them. This, one of the caustics named effectually does, and after the separation of the slough a new, and presumably more healthy, mucous membrane has been formed. It is evident that unusual care should be employed not to apply the escharotic too deeply to the denuded endometrium. But there are other cases in which an application of a milder caustic, astringent, or alterative is beneficial after curetting, and these are, when the uterus is subinvoluted, hyperplastic, flabby, apparently incapable of energetic contraction and involution; cases when the continued passive hyperemia of the organ, after the removal of the vegetations and the pulpy, thickened mucous lining, will soon result in the reproduction of the vegetations. In such cases I always swab the uterine cavity with Churchill's tincture of iodine, in bad cases even with iodized phenol, and perhaps leave a plug of cotton soaked in the fluid in the cavity for twenty-four hours. These applications need weekly repetition, or oftener, and then serve also to fulfil the previously mentioned indication of reducing uterine subinvolution or hyperplasia.

To attempt the radical removal of these vegetations by the frequent application of milder caustics and alteratives would be a mere waste of time.

In malignant disease of the endometrium, which occurs chiefly in the form of diffuse sarcomatous degeneration of the mucosa, more rarely as true carcinoma, the treatment is, first to thoroughly remove all the soft portions of the growth with the curette (now preferably the sharp scoop, as more effectual), and then apply as strong a caustic or escharotic as the thickness of the underlying uterine wall seems to warrant. Pure chromic or nitric acid, or alcoholic sol. bromine (1:5) are generally used for this purpose, or if a styptic effect is also desired, the sol. ferri persulph., pure or mixed with equal parts of glycerine. A very good styptic, although in no sense a caustic, is the saturated solution of resin in alcohol, known as James' styptic, which acts by covering the bleeding surface with a film of resin after evaporation of the alcohol.

5. *Defective development of the uterus; amenorrhea.*—This condition may be either *congenital*, the uterus never having attained the size natural to a well-developed woman ; or *acquired*, the uterus having receded from its normal state, which usually occurs as the result of excess of involution after childbirth, or after some wasting constitutional disease (typhoid fever, tuberculosis, cancer in other organs). Very frequently the ovaries participate in this imperfect development or atrophy. Besides such general remedies and measures as are likely to stimulate the whole system, and thus also the sexual organs, much may be accomplished by local irritation and stimulation by means of hot vaginal injections and applications to the endometrium. The agents used to the uterine cavity are merely such as will irritate the organ and attract a greater supply of blood to it. The astringents and alterative-astringents, like zinc, copper, iodine, nitrate of silver, would not be indicated. The chief agent used is carbolic acid, either the pure saturated solution, or Squibb's impure acid (coal-tar creasote), and its counterpart, pyroligneous acid. This must be applied two or more times a week, most thoroughly during the week just preceding the expected menstrual flow. And the applications must be continued for many months until benefit is obtained, or the futility of

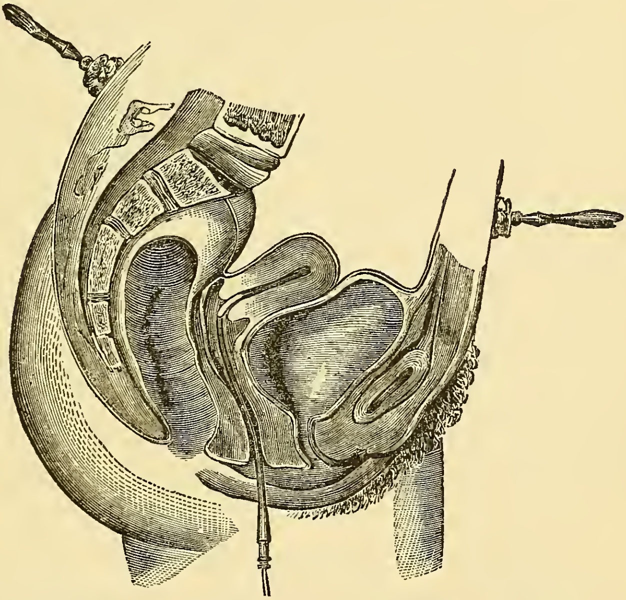


FIG. 130.—Uterine electrode as applied for faradization of the uterus. (Beard and Rockwell.)

the treatment recognized. But a much more efficient stimulus to the undeveloped or atrophic uterus, and at the same time to the ovaries, is the interrupted or Faradic electric current. This may be applied to the endometrium by means of an isolated steel sound, the other electrode being placed alternately on the abdomen over the fundus uteri and each ovarian region, or over the sacrum; the strength of the current and the length of the sitting will depend on the sensibility of the patient, and should gradually be increased, until the full strength of the battery is applied and the sitting lasts thirty minutes. As with the medicinal application, so should the electricity be applied most thoroughly immediately preceding a menstrual epoch, and two or three times a week or oftener in the interval.

In some cases amenorrhea does not depend upon deficient development or atrophy of the uterus or ovaries, but rather on a sluggish pelvic circulation and a want of innervation of the ovaries. Such cases are usually those of women who either have had children or are sterile, and about their thirtieth year rapidly grow stout and with their increasing weight gradually become amenorrhoic. In such women the nerve-force formerly expended on their ovaries and sexual functions appears to have been deflected by unknown causes to their assimilative processes. The prognosis both for the amenorrhea and sterility is generally poor in these cases, unless the nerve-force can be returned to its proper direction and equalized throughout the whole system. As soon as we reduce the flesh of these women their menstrual flow increases and there is a *chance* of their conceiving. But how to reduce the flesh is the problem which has vexed many a practitioner. The Banting, or milk cure, Kissingen, Saratoga, Kreuznach, Carlsbad or Marienbad waters, moderate diet, exercise, chiefly horseback riding—all these measures should be tried. And with these local treatment is indispensable; electricity, carbolic acid, hot injections; and if the uterus is hyperplastic, as is usually the case with parous women of this class, frequent moderate depletion by leeches and scarification to empty the overloaded vessels and stimulate the circulation. By persisting in bringing on a flow of blood from the uterus every four weeks, in course of time the spontaneous periodicity of the catamenia may often be restored.

Agents and their Therapeutical Uses.

According to the indication, the medicinal agents applied to the endometrium are divided into:

1. Caustics: Mild—nitrate of silver, iodized phenol, carbolic acid, pyroligneous acid. Strong—nitric acid, chromic acid, acid nitrate of mercury, bromine, chloride of zinc, actual cautery.
2. Astringents and Styptics: Sulphate, of zinc, copper, alum, nitrate of silver, tannin, persulphate or perchloride of iron, tincture of iodine, hydrastis, eucalyptus, resin, pinus canadensis.
3. Alteratives: Iodine, iodoform, iodized phenol, galvanic current.
4. Stimulants: Carbolic acid, faradic current.
5. Narcotics: Opium, belladonna, iodoform.
6. Disinfectants: Carbolic and salicylic acid, thymol, permanganate of potash.
7. Oxytocic: Ergot.

Caustics.—The milder caustics are used chiefly in chronic catarrhal conditions of the endometrium; the strong caustics, when it is desired to produce a more decided impression, form a slough, as in hemorrhage from diffuse hyperplasia of the uterine mucosa, and in malignant disease.

The actual cautery has already been described under applications to the cervical cavity. Its employment in the cavity of the uterus proper is too dangerous to admit of its being recommended. The effect and extent of the cautery cannot well be regulated, and even expert operators have done mischief with it. Thus I saw one gentleman, an expert in galvano-caustic therapeutics, perforate the fundus uteri with the galvanic tip (as shown by the autopsy) when only cauterization of the cervical canal was intended. The only way in which the actual cautery can be applied with any degree of safety to the endometrium is by means of the platinum tip of a galvano-cautery battery, which is introduced *cold* to within one-half inch of the fundus, the current then turned on and the tip immediately withdrawn.

Astringents and styptics.—These agents are used in very much the same class of cases as the milder caustics; besides, in menorrhagia or metrorrhagia, whether proceeding from local or general causes. In chronic endometritis, at the beginning of the treatment, the best local remedies probably are: the nitrate of silver (gr. 20 to ʒ j. to the ounce), carbolic acid (pure or equal parts with glycerine), iodized phenol (pure in aggravated cases). When the superficial film produced by these agents has come away (in from three to five days), the astringents come into play, and then the sulphates of zinc, copper, or alum (ʒ j. to the ounce, or satur. sol.), or tannin (pure or with iodoform, āā), persulphate or perchloride of iron (best mixed with equal parts of glycerine), will be found more beneficial than the continuance of the caustics. Still, a repetition of the caustic previously used, or a new one may be called for, if a trial of one or more of these astringents proves ineffectual in the course of a few weeks.

It should be particularly remembered that chronic endometritis is quite as intractable a disease as the same condition in the cervical canal, and that perseverance, caution, and avoidance of all preventable risks on the part of the physician, and patience and strict attention to directions on the part of the patient are requisite to a successful termination of the treatment. Further, that a change from one remedy to the other, from caustics to astringents, and back to caustics again, trying different strengths of the same agent, and occasionally giving the patient a week's rest, are essential points in the treatment.

If the patient suffers from metrorrhagia as a symptom of endometritis, agents should be chosen for intra-uterine application which possess a styptic or astringent property besides their caustic effect. Such are the nitrate of silver, iodized phenol, and tincture of iodine, and all those mentioned in this section. The application of carbolic acid, for instance, would increase the hemorrhage, although it might possibly benefit the catarrh. When the metrorrhagia is the only symptom for which the application is made, the astringent indication should predominate in the choice of the remedy, and the stick of silver nitrate, or saturated solution of chloride of zinc, or Churchill's tincture of iodine, or persulphate of iron and glycerine, or tannin in stick with glycerine, or alum, zinc, or copper pencils may be introduced. Pure nitric acid acts as an excellent hemostatic in a different manner, by destroying the bleeding vessels.

The resinous agents (fl. extr. hydrastis, eucalyptus, and pinus canadensis) act chiefly by their astringent and stimulant properties, but are too mild to be useful as hemostatics. The mechanical action of the alcoholic solution of resin as a styptic has already been referred to.

Alteratives.—Besides acting as caustics and astringents, the iodized phenol and tincture of iodine possess a local alterative property which is likewise peculiar to another iodine compound, iodoform. Their use is indicated in chronic endometritis when it is desired to promote the absorption of a hyperplastic mucous membrane, and set up a fresh and healthy action in place of the subacute or chronic inflammatory condition. In this sense these alteratives are also stimulants. The iodoform is also very mildly anesthetic. Besides stimulating the mucous membrane, alterative applications to the endometrium excite a subinvoluted or hyperplastic uterus to contraction and to absorption of its pathological constituents. This they do both by local stimulation of the circulatory and absorbent apparatus, and through the general system after their absorption. That agents applied to the endometrium are absorbed, and that very rapidly, is proved by the peculiar taste of iodine, carbolic acid, or iodoform, experienced in the mouth of the patient in less than ten minutes after the application.

An excellent alterative is the constant galvanic electric current, passed through the uterus by means of a probe-shaped electrode introduced into the cervical canal with a cup attached into which the cervix fits. The sponge electrode is placed over the abdomen or spine, or the electrode shown in Fig. 130, may be employed if the endometrium proper is to be acted upon, (for instance in membranous dysmennorrhœa). The sittings should be every day or every other day, and last from fifteen to thirty minutes. The alterative effect is exerted not only on the mucous membrane, but on the whole uterus, and is accompanied by a very grateful soothing influence on the nerves. I have greatly benefited inveterate cases of areolar hyperplasia with the distressing neuroses recently referred to by a persistent use of galvanism thus applied.

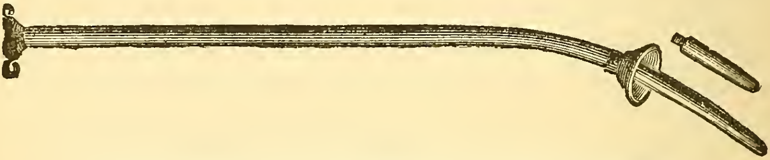


FIG. 131.—Cup electrode for galvanization of uterus. (Beard and Rockwell.)

Stimulants.—The stimulating effect of carbolic acid, and electricity on the uterus is entirely a local one. It is intended to excite the growth of the uterus or produce a flow of blood from it by irritating the organ; and anything that accomplishes this object is indicated precisely in proportion to the effect it produces, and the absence of dangerous reaction. Thus the frequent introduction of the sound, the dilatation of the cervical canal by sponge-tents introduced at intervals of one to four weeks, the stimulus of sexual intercourse, will in time arouse the uterus to an increase of size. For the development of the ovaries particularly, the interrupted current is most effectual, applied as above described. This treatment should be continued for months or years.

Narcotics.—It does not frequently happen that any of the narcotic agents above enumerated require to be introduced into the uterine cavity. If so, they are generally employed in combination with some agent which is likely to give pain, such as tannin, ergot, carbolic acid. The narcotic is then generally added to a suppository or bougie of cocoa-butter or gelatine. The most useful narcotic for this purpose (if it can be so called) is iodoform.

Disinfectants are seldom introduced into the undilated uterine cavity, for the reason that the necessity for them is not met with except in case of decomposing tumors, or after operations for the removal of such, or after miscarriage or labor at term. In all these cases the cervical canal is either spontaneously patulous, or has been widely dilated by artificial means. The disinfectant is then introduced in more or less diluted solution (as stated under Vaginal Injections) by means of the same injection-apparatus, especial care being taken that the fluid escapes as rapidly as it enters. The patient should lie with hips not higher than the shoulders, the stream should be thrown in from a fountain syringe, and the nozzle of the syringe be devoid of a central aperture. If these precautions are observed, no danger need be anticipated from such injections. Their use, of course, will be indicated so long as the condition which called for them —the presence of decomposing matter in the uterine cavity—exists.

Oxytocic.—The only agent which is introduced into the uterine cavity for the purpose of producing contractions of that organ is ergot. It has been used by Emmet and others with the object of promoting the extrusion and expulsion of submucous or polypoid fibrous tumors of the uterus, being applied in the form of suppositories of cocoa-butter containing ten or fifteen grains of Squibb's aqueous extract of ergot, and has been found very efficient in this manner. I believe, however, that the same object can be attained quite as effectually and with less inconvenience to patient and physician by rectal suppositories of the same, or slightly less, amount. The Faradic current may also be employed as an oxytocic. To many of the agents mentioned, chiefly tincture of iodine, persulphate and perchloride of iron, tannin, pinus canadensis, the addition of glycerine in equal parts, or less amount if it is not desired to dilute the application so much, is very beneficial. The firm coagula produced by the iron solutions, for instance, are prevented by the glycerine, and their accumulation in the uterine cavity thus avoided.

The agents most in use in ordinary intra-uterine medication (for chronic endometritis, metrorrhagia, subinvolution, atrophy, etc.), are the tincture of iodine (simple and compound), pure and impure carbolic acid, solution of nitrate of silver, nitric acid. The first three, either pure or mixed with glycerine, are almost the only ones used by me.

The time and frequency of making intra-uterine applications depends entirely upon the indication. In serious cases, of course, no time should be lost, and alarming or long-existing hemorrhage or malignant disease should be attacked at once by the remedy appropriate to the case. Many a time have I applied the tincture of iodine to a bleeding endometrium, feeling that the first indication was to arrest the hemorrhage, and have then, at my leisure, removed its cause.

As a rule, intra-uterine applications should be made in the intermenstrual period, the nearer the last period (*i.e.*, the more impressible the endometrium after the superficial exfoliation of its epithelium) the better. Thus, alterative applications are most effective soon *after* the period. Stimulant applications, however, which are made to bring on the menstrual flow, meet with the best results if made immediately *before* the expected appearance of that phenomenon. Also, when an immediate styptic effect is desired, *i.e.*, when the intention is to diminish an expected menstrual flow, a styptic application immediately before the period is indicated. On the other hand, styptic, astringent, caustic and stimulant agents are in order after the flow when a lasting impression is desired. The frequency of intra-uterine applications must be regulated by the severity of the disease and the tolerance of the patient. Some patients will easily stand three applications a week, others react severely on one. It is, therefore, always wise to begin with a mild application until the sensitiveness of that particular patient has been ascertained.

Caustics should, as a rule, be repeated not oftener than once a week; the strong agents not until the slough has disappeared, and then only if the pathological condition appears so little improved as to decidedly call for a fresh cauterization.

Astringents will probably need to be applied at least twice a week. Styptics only as often as the hemorrhage returns; or if it continues, every day until it ceases. Alteratives generally twice a week. Stimulants the same, or oftener. Of narcotics and disinfectants it is only necessary to say that their application is usually but temporary, and depends entirely on momentary indications.

The sole oxytocic, ergot, will be used in utero only so long as it either produces the desired result or shows its inefficiency, probably not longer than a few days.

The *strength* of intra-uterine applications has already been referred to in discussing the various agents. It is impossible to make fixed rules as to the strength of an application for each individual case. General directions having been given, the practitioner must learn by experience how strong solutions or combinations a patient needs or can bear. The rule to begin with milder applications and to gradually increase their strength as the endurance of the patient becomes known has already been pointed out. As a disease improves, the applications should be made less and less frequently, and their strength be gradually reduced, or the agent changed for a milder one, until the disease is entirely cured.

Conditions Necessary for Intra-uterine Applications.

An *indispensable condition* to the proper application of medicinal agents to the uterine cavity is that the cervical canal and its upper and lower orifice be sufficiently patent to permit the easy passage of the instrument carrying the remedy. A uterine canal which permits the free passage of the Simpson sound will usually, unless very tortuous or rugous (flexions, endotrachelitis), admit any of the ordinary applicators wrapped with a thin film of cotton. Other methods of application (hereafter to be described in detail) will require preparatory dilatation in proportion to the method. The more thorough the application is to be and the more powerful the agent, the more sloughing and discharge is likely to follow it, and the larger must the cervical canal be, in order that the sound parts be not touched when the application is made and there be no obstruction to the discharge. When frequent applications are required, when a powerful caustic like nitric acid, iodized phenol, or chromic acid is to be used (as is often the case in hyperplastic or villous endometritis, and always in malignant disease) the cervical canal should be previously dilated by artificial means. A sponge, laminaria, or tupelo-tent, will accomplish this within twelve hours. It should be remembered, however, that in a very large proportion of the cases in which intra-uterine applications are required (endometritis, metrorrhagia) the constant flow of either mucus or blood in itself dilates the canal and renders it patulous, and that, therefore artificial dilatation may often be dispensed with.

When disinfectant applications to the endometrium are required the conditions which call for them (sloughing or removal of fibroids, or malignant growths) will also have procured a sufficient dilatation so that the fluid, which in these cases is best introduced by injection, can readily enter and escape.

A precaution to be observed with all applications to the endometrium is to prevent the agent from escaping from the external os and burning the vagina and perhaps the vulva. This is likely to occur as well with solid agents, which melt, as with originally fluid remedies. It can be prevented by placing a tampon over the os, or plugging the cervical canal with cotton.

Other special conditions and precautions will be referred to under each separate method.

Methods of Making Intra-uterine Applications.

Medicinal agents may be introduced into the uterine cavity by various methods and in numerous forms. The following list comprises all in present use, the most efficient and practical being named first:

1. On applicators (probe-shaped rods) wrapped with cotton.
2. Through an applicator-syringe.
3. By injection.
4. In soluble tents or bougies.
5. As ointments.
6. On a caustic-holder.
7. As powders.
8. As spray.

The nature of the application indicates that, by Methods 1, 2, 3, and 8, only fluids can be introduced; by the other methods, solids and powders. I might have divided the applications into those of fluid, and those of solid agents; but thought it would be more practical to classify the methods according to their efficiency, since some of the agents (iodine, nitrate of silver) are applied both in the solid form (in tents and stick) and in solution.

1. *On Applicators.*

The application of fluids to the endometrium differs in execution and facility accordingly as the cervical canal has its normal dimensions, or has been dilated by natural or artificial means.

a. *Through the undilated cervical canal.*—The instruments employed to carry fluids into the uterine cavity are sound- or probe-shaped rods of metal or hard rubber. The vehicle containing the fluid is cotton, preferably clarified, absorbent cotton, which is wound about the uterine end of the applicator, at a thickness adequate to absorb sufficient fluid, and still not to interfere with the passage of the applicator. Applicators are either flat or round, and if the latter, gently tapering to the point. The metal applicators are made of silver, aluminium, platinum, even gold, for the *praxis aurea*, or of copper, nickel-plated, for hospital use. The objection to the plated applicators is that they require frequent replating, but their cheapness (for they are very easily twisted and ruined) fully counterbalances this disadvantage. A greater objection, in my mind, to all soft metal applicators is their extreme flexibility, which in a but slightly patent or rugous canal results in their bending at every obstruction, and interfering with introduction. Mere curvature of the canal is no obstacle, since the applicator can, and should, be bent to conform to the previously ascertained curve. Inflexible metal applicators are not in use in this country, hard rubber having taken their place. I, for my part, prefer applicators made of hard rubber, shaped like Simpson's sound, but much thinner, perfectly smooth, and very slightly elastic. The late Prof. Charles A. Budd has the credit of having introduced them into practice, although I find Dr. G. S. Winston's name connected with a precisely similar instrument. Some of these applicators are made with a bulbous tip, but I decidedly object to this, as it renders the removal of the moist cotton after the application a difficult matter. A very good hard-rubber applicator with flat uterine portion is made by Shepard & Dudley of New York. The straight, tapering, and exceedingly elastic rubber applicator, also credited to Dr. Winston, does not meet with my approval, as it twists and bends at every angle or rugosity of the uterine canal, and is exceedingly difficult of introduction, except in a widely patent passage. In some applicators the uterine two and one half inches are slightly roughened, so as to retain the cotton. This is not at all necessary, and occasions decided annoyance when the moist cotton is to be removed. The flexible metal applicators first recommended by Emmet, and sold under his name, had a wire-spring slide for the purpose of slipping off the cotton. But this slide interferes with the handling of the instrument, and, if the cotton is properly wrapped, is not needed.

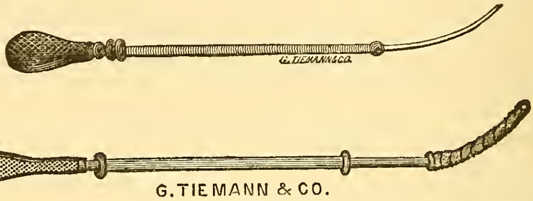


FIG. 132.—Emmet's metal wire-spring slide applicator, plain and wrapped with cotton.

A certain knack is required to wrap an applicator properly with cotton, so that the cotton envelope will not be too thick, nor too tightly wound, or so loosely as to be slid up from the point when the applicator is passed through the internal os (the narrow spot of the canal), or be left in the cavity when the applicator is withdrawn. The physician should practise wrapping his applicators until he has acquired the necessary skill, as a trained nurse may not always be at hand. The applicator is seized in the right hand, its end moistened, and a thin film of absorbent cotton, about three inches long by two inches wide, is laid on the palmar surface of the four fingers of the left hand; the applicator is then seized between the thumb and first two fingers of the right hand, and placed lengthwise on the film of cotton, close to its left border. By then rotating the applicator with the right hand, the cotton is twisted around its uterine end, and evenly and smoothly arranged by the thumb and two first fingers of the left hand. Care should be taken not to let the twisted cotton project beyond the end of the applicator, else this loose bit will double over and prevent the passage of the instrument. The end of the applicator should be smoothly and tightly covered, so that there is no danger of the bare point being pushed through it, and the cotton slipped up the applicator as its tip passes the internal os. If this should occur, and force were used, under the impression that the length of cotton-covering still outside of the external os shows that the point has not reached the fundus, it is evident that the uterus might be seriously injured. It is well to wrap not less than two and a half, and not more than three inches of the tip of the applicator with cotton, in order to be able to see, by the end of the cotton being at the external os, that the fundus has been reached, and also to be able to seize the projecting bit of cotton with the forceps, in case it should chance to be left behind in the uterus. This, of course, will also be recognized by the touch.

The cotton should be wrapped so tightly, especially near the tip, that it will not slip and become wrinkled as it is passed through the cervical canal; and again not so tightly that it cannot absorb readily and be easily slipped off after its withdrawal from the uterus. If a flat metal applicator is used the uterine end should be dipped in oil or vaseline before wrapping it, which will greatly facilitate the removal of the cotton. This is readily done by seizing it between the blades of the dressing-forceps and slipping it off. The cotton wrapping should correspond in thickness to the size of the uterine canal. In the undilated state, no more than a thin film of cotton can be passed.

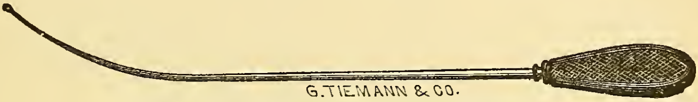


FIG. 133.—Budd's hard-rubber applicator and probe.

Manner of using the applicator.—It is almost needless to say that the application must be made through a speculum. If the cervical canal is normally patent and there is no tortuosity or flexion, a large cylindrical or pluri-valve will answer, precisely as for the passage of the sound. But an application is more difficult in that the cotton film, no matter how smoothly rolled, will be likely to catch in the cervical canal and the cervix be pushed back and the application fail. It is therefore generally necessary to steady the cervix, and draw down and straighten the uterus by a tenaculum hooked into its anterior lip. The direction and width of the uterine canal should have been ascertained before making the application by passing the sound after the speculum has been introduced. I prefer the sound to the probe, as it gives a better indication of the width of the canal. If the sound cannot be passed through the round or valvular speculum, it is evident that an application will fail; and the Sims speculum should be at once inserted in the position and according to the rules already described.

The following *rules* apply to an application through any speculum: The cervix having been exposed, the anterior lip is seized with a tenaculum, the uterus gently drawn down and straightened, and the sound passed to the fundus. The direction and width of the uterine canal thus ascertained should be carefully remembered, as it is exceedingly awkward to find the point of the applicator arrested at some spot within the canal, and the fluid expressed in futile attempts to reach the fundus. The operator then seizes an applicator (of which several should be at hand wrapped with cotton) and passes it dry to the fundus in order to absorb and remove the uterine secretions, or any blood which may have escaped since the sounding. If the secretion is very thick and tenacious, it should be removed with the uterine syringe, or an applicator dipped in a solution of bichromate of potash (1 : 8) may succeed in detaching it. Several applicators may thus need to be passed before the canal is clear and dry. If the oozing (chiefly of blood) is rapid, it is well to leave one applicator in the uterus to absorb it until the medicated rod can be prepared and introduced.

In moistening the applicator in the fluid, care should be taken not to saturate it too profusely, or the majority of the fluid will be squeezed out and flow on the vagina before the uterine cavity is reached. The bottle containing the agent should be placed conveniently at the right hand, the soaked applicator standing in it ready for the hand of the operator. The uterine cavity having been mopped out, the dry applicator is quickly removed and dropped into the basin, and the medicated applicator seized and passed rapidly in the familiar direction to the fundus. If there is any obstacle to its immediate passage, that attempt may be put down as a failure, since the irritation of the internal os by the agent results in its contraction and closure to the point of the applicator. The latter may then as well be withdrawn, and the attempt repeated after a short interval. If the canal is not very pervious and the agent is particularly irritant or caustic (like pure carbolic acid or iodized phenol) it may be advisable to protect the cervix and vagina by placing a layer of cotton underneath it.

The applicator, having been safely passed to the fundus, may be allowed to remain a few moments, especially if it be soaked in iodine with a hemostatic purpose ; or, if an irritant or caustic effect is desired, it may be drawn back and forth several times and then removed. If it is grasped by the uterus, no force should be used, for in a few moments the contraction will cease and the applicator is then easily withdrawn. If a very decided effect is intended, or if hemorrhage still continues, the application may be repeated with a fresh applicator. When the applicator has been withdrawn, the tenaculum is detached, all excess of fluid is mopped up, the vagina dried, and a flat tampon soaked in glycerine having been placed over the cervix, the speculum is removed.

b. *Through the dilated cervical canal.*—The canal may be dilated either as a result of the condition which calls for the application (endometritis, metrorrhagia), or it may not have contracted after a shortly preceding miscarriage or labor, or it may be naturally patulous on account of many labors and subinvolution, or finally, it may have been dilated by artificial means. It is self-evident that the more pervious and the wider the uterine canal the easier the introduction of sound or applicator. When a very thorough application is intended, and every portion of the endometrium is to be touched, it is advisable to dilate the uterus before making the application. It is not always necessary to do this with slowly dilating measures (tents), but rapid forcible dilatation may suffice. I frequently introduce the two-bladed steel dilator shown in Fig. 156, and stretch the whole cervical canal with its two orifices to the width of half an inch, and then find a previously impossible or difficult application an easy matter. Or I introduce the applicator into the uterine canal between the branches of the dilator when they are separated.

When the uterine canal is moderately dilated, I either use the stiff whalebone applicator, above described, wrapping more cotton about it, or I employ the thicker applicator with a slide introduced by Sims. This applicator is stiffer than Budd's, and the most convenient instrument when a thorough application is to be made. When a more permanent effect is desired, I slide the cotton off (the left hand pressing the slide against the cervix while the other withdraws the rod), and leave it in the uterine cavity for twenty-four or forty-eight hours. I then either remove it myself or let the patient do so by a thread attached to it. This maneuvre is specially useful in case of hemorrhage, when the strong tincture of iodine is the article used as a styptic. In subinvolution and areolar hyperplasia a more decided stimulant and absorbent effect may be thus obtained. In hemorrhage the cotton itself acts as an intra-uterine tampon. If not removed, the cotton will in two or three days become loosened in the uterine cavity, there will be a somewhat offensive discharge, and the cotton will either be washed out by this discharge or be expelled by uterine contractions. Occasionally, however, the retained cotton will produce so much irritation, local (hemorrhage) and constitutional (febrile reaction), as to require immediate removal as soon as these symptoms present themselves. While it may be beneficial in hemorrhage and diffuse hyperplastic endometritis to allow the cotton to slough away, it is generally advisable to attach a stout thread to the plug (as seen in the diagram) by which the patient herself can remove it whenever necessary. In no case should the plug be allowed to remain in the uterine cavity longer than three days. Even this period would be inadmissible did not the iodine in which the plug was soaked prevent its early decomposition. When the uterine canal is widely pervious, as after labor or miscarriage, or dilatation by tents, I generally make the application by means of the ordinary straight whalebone or hard-rubber screw-stick (see Fig. 116), the screw end of which is wrapped tightly with as large a roll of cotton as will pass soaked in the agent, and the cervix being steadied with the tenaculum, is passed straight to the fundus and twisted about there until the whole cavity is thoroughly mopped. I have thus frequently applied iodine, carbolic acid, iodized phenol, and even pure nitric acid. If the external os is sufficiently patulous and its lips are separated by the tenaculum, very little fluid will touch the outer portion of the cervix and escape into the vagina. Of course, the usual precautions of first mopping out the cavity, and protecting the vagina with cotton should be observed, and an excess of fluid should be squeezed out of the cotton. The glycerine tampon is of course placed over the cervix.

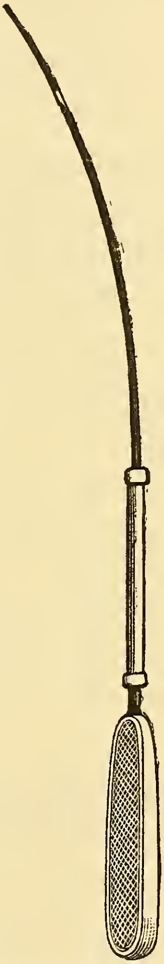


FIG. 134. — Sims' hard-rubber slide applicator, plain.

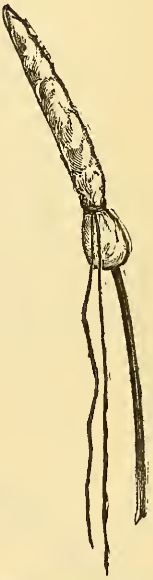


FIG. 135.—Sims' slide applicator wrapped with cotton for saturation, and to be left in the uterine cavity. (P. F. M.)

When an application of so powerful an agent as nitric acid is made to the endometrium it is done because a milder remedy is not thought sufficient; the effect desired is, therefore, as thorough a one as is consistent with safety. The conditions in which nitric acid is employed are chiefly polypoid vegetations of the endometrium (endometritis villosa, polyposa, hyperplastica, hemorrhagica), the main symptom of which is hemorrhage, malignant degeneration (sarcoma) of the uterine mucosa; and membranous dysmenorrhea, in the latter of which it is desired to destroy the mucous membrane down to the muscular coat, and substitute cicatricial tissue, or at least remove so much of the hyperplastic membrane as to insure the growth of a new, presumably more healthy, coat. The acid must therefore be employed *thoroughly*, and no fear need be entertained that an excess will create too deep an eschar. It is not diffusible like caustic potash, and rapidly produces an albuminate with the tissues which prevents it from entering deeper than to a certain limited extent into the mucous membrane. The shock and reaction from nitric acid applied to the endometrium, when applied in this manner through a widely dilated cervical canal from which the slough and secretions can readily escape, is no greater than after iodine or carbolic acid; and the benefit, in the proper cases, is most decided.

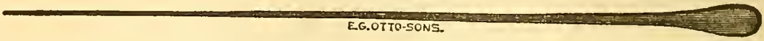


Fig. 136.—Winston's flexible hard-rubber applicator.

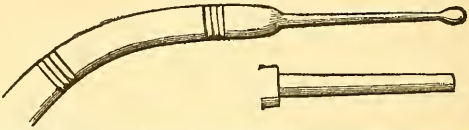


Fig. 137.—Applicator and canula, for intra-uterine medication, of Lombe Atthill.

The *advantages* of these applications on cotton-wrapped applicators are the ease, rapidity, painlessness, with which they are performed, and the absence of the necessity for previous dilatation of the uterine canal.

The *disadvantages*, however, are quite sufficient to induce us to seek other and better means. These disadvantages may really be summed up in one word—inefficiency. In the cases where a widely dilated cervical canal permits the easy, unhindered introduction of a large cotton swab, the application can be made thoroughly and the result will be proportionately rapid and good. But when the canal is narrow, that is, when it has the normal width and merely admits the sound, it is unavoidable that by far the largest portion of the fluid in which the applicator was dipped must be pressed out and trickle out of the os, and what little reaches the

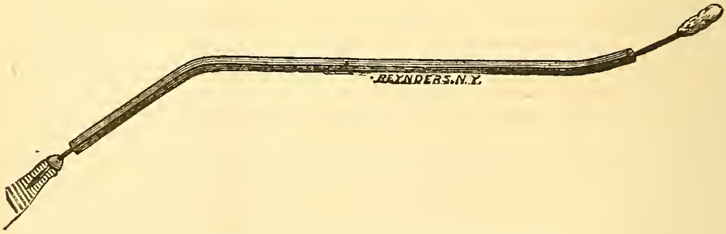


Fig. 138.—Woodbury's canula for intra-uterine application.

uterine cavity proper is so neutralized by its contact with the secretions of the cervix as to be almost inert. In the vast majority of cases with normal cervical canals, I really believe that the effect of the agent is expended entirely on the mucous lining of the cervical canal, and that the endometrium proper is touched merely by the albuminous coating of the applicator. Where an irritant effect is desired, this may be of little consequence, for the applicator itself drawn back and forth irritates the endometrium; but when a decidedly caustic or astringent influence is intended, the result generally fails to meet the expectations.

To remedy this objection various contrivances have been proposed by which it was designed to protect the cervical canal from the remedy, as well as the remedy from the cervical canal, and keep the applicator free until it had passed the internal os. The manner of accomplishing this was by means of a tube which was introduced into the cervical canal up to or through the internal os, and through which the applicator (or stylet, as it is then called) is passed. Such devices are those of Wylie of New York, Lombe Atthill of Dublin, Woodbury of Washington, D. C., Peaslee, and numerous others.

These canulæ, or cervical specula, are made of metal (silver or platinum), hard rubber, or glass (Woodbury's). They are introduced into the cervical canal up to (and should be through) the internal os; the cotton-wrapped stylet, which has been soaked in the agent and withdrawn into the canula, is then pushed forward until it touches the fundus. Or the canula may have been inserted alone, and the stylet is then thrust through it. Canula and stylet are then removed together.

The principle of these instruments is very good, but, as with many other contrivances, is not confirmed by practice. If the cervical canal and internal os are sufficiently patulous, no doubt the canula can easily be passed through the latter, and will answer its purpose perfectly. But in these cases we can perhaps succeed quite as well without the canula, although doubtless all contact with the cervix is obviated by it. But in the very class of cases in which such a protector is most needed, in the normal cervical canal, with narrow internal orifice, perhaps with an angle of flexion at that spot, the cervical protector is too large to pass through or even to the internal os. To be of any service the canula must have at least the diameter of one-eighth of an inch inside measurement, and this is precisely the diameter of the bulb at the tip of Simpson's sound. Now take the thickness of the walls of the canula, and add a little lee-way for the stylet to play, and we have a canula of at least one-fourth inch diameter, which is the least size through which a cotton-wrapped

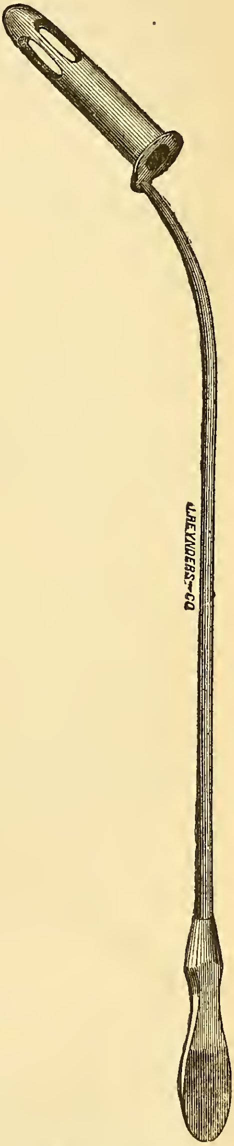


FIG. 139.—Peaslee's tube for intra-uterine application.

stylet can be thrust without expressing the fluid. And a normal internal os seldom measures one-fourth inch in diameter. Besides the sharp border of the canula catches at the internal os and can be introduced no farther. Unless the canula passes the internal os, the stylet will almost inevitably catch at that spot, and the application prove a failure. I speak from an extended experience in making this criticism on these applicators with cervical protectors, and much prefer to make an application between the divergent branches of a steel dilator.

When the cervical canal is dilated, however, and the canula can pass the internal os, it is a great convenience. And I notice that the inventors of these instruments speak of their employment in precisely such cases. For the application of nitric acid, they are then particularly useful, and Atthill employs his applicator almost entirely for this agent. Before applying nitric acid or iodized phenol to the endometrium, I should always dilate the cervical canal thoroughly and consider the whole procedure in the light of an operation; the gravity of the diseases requiring such powerful remedies certainly justify that precaution. An ordinary glass tube, with an inside diameter of half an inch, will then answer every purpose, and it need not even be curved when the cervical canal is so widely dilated.

A cheap and, compared with the instruments above described, equally efficient contrivance is that of an ordinary No. 12 elastic catheter, with the end cut off square; the mandrin is then used precisely like the stylet in the other applicators. I believe it was devised by Dr. James. R. Chadwick, of Boston. If it were safe to *inject* fluid into the undilated cavity of the uterus, this would be a very easy way out of the dilemma. But, as I shall explain in detail, hereafter, intra-uterine injections, even with all proper precautions, are so dangerous as to have been almost abandoned by the profession. With the view of combining the efficiency of injections with the safety of applications, several gynecologists have hit upon a plan, which I shall now describe under the name of the

2. *Applicator-syringe.*—Several years ago, having by experience become fully alive to the objections against the ordinary uterine applications, I chanced to meet with Buttles' uterine syringe, and it occurred to me that a very good way to avoid the expression and albumination of the fluid in the cervical canal would be to first fill the syringe with the application fluid, then wrap absorbent cotton about the uterine portion (precisely as described for the applicator), introduce it, and gently express the fluid. The dry cotton having thus been introduced into the uterine cavity, the slow expression of the fluid would gradually saturate the cotton, and the agent thus in its undiluted condition come in contact with the endometrium. I at once put this idea into execution, and found that it answered perfectly; the very slender nozzle of the syringe (which is of hard rubber and holds about one-half a drachm of fluid) when wrapped by a thin film of cotton, presented no obstacle to its introduction through almost any normal cervical canal; the thin film of cotton allowed the fluid

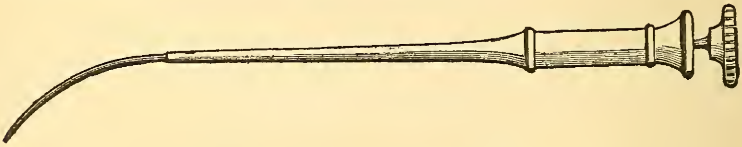


FIG. 140.—Buttles' intra-uterine syringe. (P. F. M.)

to ooze through it gradually (as can be seen on trying the experiment outside of the body), and the shock of the rapid injection of fluid was thus avoided. Nothing but the usual slight sensation of warmth in the hypogastric region, occasionally moderate pain, was experienced. As soon as the cotton was saturated, the fluid escaped from the external os; and this was a sign to cease the injection. I made the application usually through a Sims speculum, but frequently through a large cylindrical or bivalve, and found no difficulty in passing the slender cotton-wrapped syringe tip to the fundus uteri. Only in three or four instances did I witness more than the above-mentioned slight hypogastric pain. I have applied through this syringe only the tincture of iodine (simple and compound), the pure and impure carbolic acid, the nitrate of silver (ʒ j. to ℥ j.), and pure nitric acid. Of these, the nitric acid, the impure carbolic, and the silver-nitrate solution alone produced a decided constitutional shock, which in two instances required the hypodermic use of morphine, alcoholic stimulants, and a rest of several hours, in the others only rest. The iodine in no case produced an unpleasant reaction.

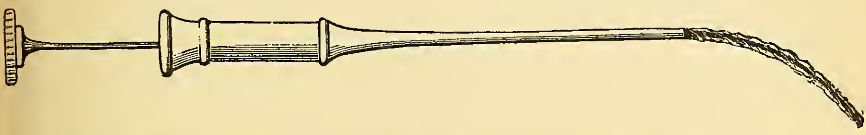


FIG. 141.—Buttles' intra-uterine syringe, filled and wrapped with cotton, ready for use. (P. F. M.)

In order, however, to avoid even this rare shock, I adopted the plan of propelling the piston of the syringe merely by turning it, as one does a screw, and withdrawing it as soon as I noticed fluid escaping from the external os. In this manner any sudden forcing of the fluid through the cotton into the uterine cavity was avoided, and an excess at once relieved. I have employed this method many hundreds of times, and am convinced that it is the most efficient, convenient, and safe method of making intra-uterine applications. Even the application of nitric acid, which was only once followed by shock, was performed through an undilated uterine canal. Had previous dilatation been practised, I am confident no reaction would have occurred, and subsequent experience confirms this view.

After I had used this method for all cases in which the cervical canal was not sufficiently patulous to permit the unobstructed passage of the applicator, I heard accidentally that Drs. Lawson and Lente, of New York, had proposed a similar device several years previously. On looking the matter up, I found that these gentlemen had recommended the ordinary hypodermic syringe with a long flexible uterine tube of silver for the same purpose. The advantage of these silver tubes is that they can be bent to conform to the curve of the uterine canal; but the objection to

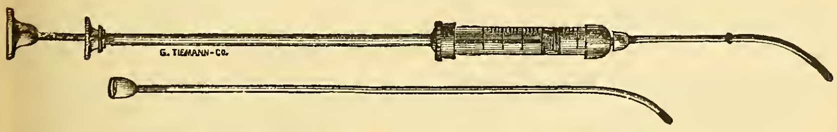


FIG. 142.—Lawson and Lente's intra-uterine applicator syringe.

them is that they are more likely to become clogged by the corrosion of the metal from the nitric acid or iodine, which are among the principal agents used for intra-uterine applications. The nitrate of silver will of course tarnish pure silver, if the solution is at all strong.

In all these applicator-syringes the final two and a half inches of the uterine end of the tube are made very slender (the uterine portion of Buttles' hard-rubber syringe is a fine piece of workmanship), and are perforated with numerous small holes. The expansion of the tube two and a half inches from the tip shows the limit of the normal uterine canal. This application may be made without a speculum, the syringe being introduced like the sound on the finger; but the oozing of fluid from the os requires a tampon, which cannot readily be placed without a speculum.

Care should be taken to wrap the cotton sufficiently tight about the syringe, or it may be left in the uterine cavity when the nozzle is withdrawn. But it should not be wrapped so tightly as to interfere with its proper saturation with fluid from the syringe. If the cotton should slip from the nozzle and remain in the uterine cavity, the dressing-forceps should be introduced and the cotton plug sought for until found and withdrawn. If particular difficulty is experienced in accomplishing this, it may be preferable to leave the expulsion of the cotton to the uterus, which will generally contract upon and express it in a few days. Or it will be washed out by the ordinary uterine discharge. Should it not be noticed in the secretions, or in the water escaping during the usual vaginal injections, the patient having been instructed to watch for it, a fresh attempt may be made to remove it with forceps, or the uterus may be rapidly dilated with steel-branched dilators, and the cotton removed. Obviously, it would be unsafe to allow a foreign body of the putrescent character of cotton to remain in the uterine cavity for an indefinite period; besides the risk of septic infection, a hemorrhage would be excited by it sooner or later.

Hegar and Kaltenbach recommend a simple device for introducing a strip of linen soaked in some fluid into the uterine cavity. It consists of a sound with perforated tip, through which a stout thread is passed, to one end of which the strip of linen, or skein of cotton is tied. When the tip of the sound is at the fundus, traction on the free end of the thread will draw the tampon into the uterine cavity, where it can be left, if desired, by holding it in with the dressing-forceps while the sound is withdrawn. A strip of linen may also be carried up into the uterine cavity, if the passage is well dilated, by simply pushing it up with uterine dressing-forceps, leaving the free end hanging from the cervix. But, it will be at once apparent that in any case in which the cervical canal is wide enough to permit either of these maneuvres—in fact, whenever the Simpson sound can easily be passed—all such applications are best made with the ordinary applicator wrapped with cotton as above described; or, if it is desired to leave the cotton in the uterine cavity, the stout slide-applicator of Sims is by far the best and most convenient instrument. Before leaving the

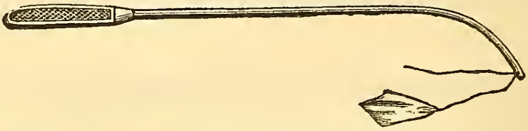


FIG. 143.—Sound for introducing saturated linen strips into the uterus. (Hegar and Kaltenbach.)

subject of intra-uterine applications by cotton-wrapped probes, it may be well to say a few words on the

Tamponade of the uterine cavity, which fits very well in this place. From the description of the use and objects of the Sims slide-applicator, it is quite evident that the cotton slipped off from it, and left in the uterine cavity, will act not only by its medicinal ingredients, but also by direct pressure on the endometrium. The plug thus introduced, therefore, acts as a styptic, which is the object desired in tamponing the uterine cavity. If, therefore, a woman is bleeding from her uterus, the uterus is not at all, or but moderately, dilated, and it is desired to arrest the hemorrhage at once and with absolute certainty, the very best means to accomplish this is to introduce as large a cotton plug as possible up to the fundus on a Sims slide-applicator, slip it off and leave it in the uterus for twenty-four hours or longer. The effect of the tampon is greatly increased by saturating it in strong tincture of iodine as described, which besides guards it from decomposition. This, then, is the simplest, quickest, and most efficient method of arresting uterine hemorrhage by tamponing the cavity of the organ. A vaginal tampon applied through a Sims speculum (as described under Tampons) should generally be introduced, and both these applications repeated in twenty-four to forty-eight hours. The vaginal tampon may be renewed in twenty-four hours, the uterine not until forty-eight hours or longer, if the hemorrhage has not returned. It can be removed by the string attached (see Fig. 143) or it may have been left so long as to project from the external os, and be easily removable by forceps. It may not require repetition if the hemorrhage has ceased. It is advisable to combine the influence of rest and internal hemostatics with the local measures, in order to remove the cause of the flow and prevent its repetition.

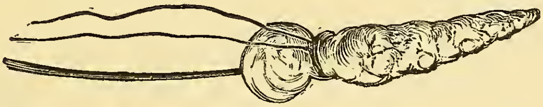


Fig. 144.—Slide-applicator, wrapped with thick cotton plug, for tamponade of uterus. (P. F. M.)

When the uterine canal is widely dilated, as after removal of a fibroid polypus or submucous or interstitial fibroid, or occasionally for persistent hemorrhage after abortion, the uterine cavity is tamponed more after the manner described for the vagina, viz., by passing small flat pledgets, or little balls of cotton, soaked in carbolized alum, or weak chloride of zinc solution, and squeezed dry, into the cavity with long forceps, and packing them tight until the cavity is filled ; a vaginal tampon then keeps the uterine column in place. The uterine pledgets are removed, by screwing the tampon-extractor into the cotton, and removing them one by one. Both the introduction and removal of the tampons are best performed through Sims' speculum.

3. *Injection.*—I shall not devote much space to the discussion of the injection of fluids into the undilated uterine cavity, for the reason that I think they are not to be recommended. Many articles have been written on the subject, the majority of the writers agreeing that uterine injections are an efficient remedy in catarrhal and hemorrhagic conditions of the endometrium, but accompanied by a degree of danger which should lead us to be extremely cautious in using them. The late Dr. J. C. Nott, of New

York, was one of the last to write an elaborate and widely quoted article on the subject, in which he maintained that intra-uterine injections are safe and justifiable if the uterine canal is thoroughly dilated and there is no obstruction to the free escape of the injection fluid, and subsequent secretions. This is at present the opinion of the large majority of careful gynecologists all over the world; but it is safe to say that, the uterine cavity having been once thoroughly dilated, it is still less dangerous, while quite as efficient, to mop it out with an impregnated cotton swab (such as the screw-stick repeatedly spoken of).

The dangers from intra-uterine injections do not lie so much in the strength or nature of the chemical agent used, although of course the more powerful the agent, the stronger its local and general impression; but rather in the shock imparted to the nervous system by the sudden dilatation of the uterine cavity by the injection fluid, in the danger of peritonitis from the uterine irritation, and finally, in the possibility of the fluid passing through the Fallopian tubes into the peritoneal cavity, and there setting up a violent peritonitis. The two first accidents, shock and peritonitis, are the most likely to occur; but the entrance of fluid into the tubes has in several instances been verified at the autopsy. To prevent the shock and the passage of the tubes, the inevitable rule of previously dilating the uterine canal has been laid down, supposing that the ready escape of the fluid would prevent these accidents. Notwithstanding, several of the sixteen deaths which I find reported as having occurred in consequence of intra-uterine injections, took place after the necessity for this precaution was recognized, and under the hands of experienced and competent operators. Numerous cases of merely temporary shock, collapse, uterine colic, and of peritonitis, followed by recovery, which have doubtless occurred as a direct result of these injections, have not been reported, but their occurrence has doubtless led all cautious gynecologists to *limit intra-uterine injections, even with a dilated canal, to such cases in which ordinary applications failed, or the removal of intra-uterine tumors or an immature ovum required the cleansing of the widely dilated cavity by antiseptic irrigation.* In the latter class of cases I have frequently washed out the uterine cavity with both hot and cold water, propelled either by a Davidson or fountain syringe, and have never seen the slightest evil result therefrom. I have several times seen quite severe shock and uterine pain follow applications with the applicator-syringe, as just described, when the fluid was forced too rapidly through the cotton, so as almost to resemble an injection, and have no desire to repeat such an experiment. In any case where it is justifiable to run such a risk as an intra-uterine injection carries with it, it is certainly worth the while to dilate the cavity thoroughly and make the application by a swab. For the benefit of those cases in which repeated powerful applications fail (such as obstinate chronic endometritis, and hemorrhage from flaccidity of the mucosa), and an excess of the agent seems called for, I will point out briefly the manner of injecting the uterine cavity: the width of the uterine canal being at least that of the little finger, the cervix is exposed through a large plurivalve speculum ; the uterus drawn down and straightened by a tenaculum in the anterior lip, so as to efface any angle at the internal os. The syringe is then filled with the fluid (tincture of iodine, carbolic acid, iodized phenol, sol. persulphate or perchloride of iron with equal parts of glycerine) and introduced to the fundus. Withdrawing it then about one-fourth of an inch, the fluid is *very gently and slowly* expressed, drop by drop, by turning the piston-screw, not pushing it, until from five to ten minims are expressed, according to the size of the cavity. This expression should occupy several minutes. The patient should be kept in bed, and under opium for at least twenty-four hours.

The syringe may be either that of Buttles or Lente, or if a larger tube is desired, that of Bumstead is a good instrument. Or the glass tube with rubber bulb of Woodbury or White may be used. Dr. Nott used a double current catheter, through which he injected several ounces or more of medicated water, beginning with plain water to test the uterus. His catheter is almost identical with that of Skene for the bladder.

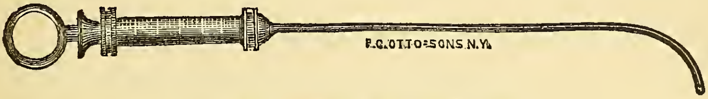


FIG. 145.—Bumstead's intra-uterine syringe.

It is better to make all intra-uterine injections on the back, rather than in the semiprone position, because the escape of the fluid is facilitated in the dorsal position, and there is less likelihood of the fluid passing into the Fallopian tubes.

The frequency of strong intra-uterine injections will conform entirely to the necessities of the case and the general rules given under applications.

A use of intra-uterine injections which cannot be classed under the same category as those treated of here, is for the cure of sterility by injecting a small quantity of fresh semen into the uterus. The same precautions should be observed as in therapeutic injections, so far as gentleness and slowness of expression of the fluid is concerned; but it is not customary to dilate the uterus beforehand. Still, if the canal were abnormally narrow, the injection even of semen would be quite as hazardous as of a chemical agent. For, even a few drops of pure water or glycerine have produced severe uterine colic.

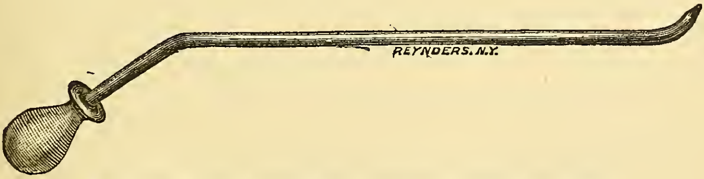


FIG. 146.—Woodbury's instillation tube for intra-uterine medication.

4. *Medicated tents or bougies.*—With the view of avoiding the expression of the agent while it is passed through the cervical canal and of escaping the dangers inherent to uterine injections; with the object, therefore, of combining efficiency, safety, and ease of application, and of avoiding the tedious and always somewhat hazardous preliminary dilatation of the uterine canal, the device was adopted, years ago, of incorporating the medicines in some soluble but temporarily solid vehicle, to which a pencil-shape was given, and which was introduced into the uterine cavity and allowed to melt there. The vehicle may be either cocoa-butter, gum-tragacanth, gum-arabic, paraffine, or gelatine. Tannin powder is the only substance which can be simply rubbed up with glycerine and rolled out

to any thickness desired on a porcelain tablet; it hardens in the air, but does not readily dissolve in the uterine cavity. Cocoa-butter makes a very good vehicle for suppositories, but it is too fragile for pencils so thin as these for the uterus require to be, and it has, therefore, been abandoned for this purpose. Gum-tragacanth and gum-arabic powder make elegant, slender pencils, but they become so hard as to readily injure the endometrium and, what is quite as important, *quoad therapiam*, not to melt, and therefore prove inert. This last objection applies to paraffine, and until recently also to gelatine. But within the past two years, at the suggestion and in accordance with formulæ of Dr. Wm. M. Chamberlain, of New York, a series of experiments with the manufacture of gelatine bougies have been made by Spangenberg & Boettcher, apothecaries of this city, which have resulted in the production of an exceedingly efficient article. The tents are cast in molds, the original one of Dr. Chamberlain being one-fourth of an inch in diameter; I had a second mold made of half an inch in diameter, for cases of dilated uterine cavity and where I desired to introduce more of the agent. The slender tents are four and a half inches long, the thicker but two and a half inches; the former should, of course, be divided in half, in order not to exceed the length of the uterine cavity. These tents are exceedingly smooth, pliable, and melt easily and thoroughly if left in the uterus for several hours. But it is indispensable to their solubility to keep them soft by preserving them in well-stoppered glass bottles; if exposed to the air they become hard and brittle and are absolutely insoluble, at least in the uterus. When these tents first came into the market, doubts were expressed as to their solubility, and I experimented with them, both in artificial alkaline solutions and in utero. I found that the tents which had been allowed to become hard, remained absolutely undissolved, although those containing iodine grew paler, almost white, showing that the iodine was absorbed. The soft, pliable tents, however, liquefied entirely in utero within twenty-four hours, although in the artificial solution they merely swelled and grew paler in color. I positively assured myself of their dissolution in the uterine cavity, by tamponing the vagina and removing the tampons the next day, when with an applicator I found the uterine cavity empty, and only a thick discharge oozing from it (of brown color, if iodine was used).

Dr. Chamberlain recommended the introduction of the tents by pushing them into the uterine cavity through a speculum with the dressing-forceps. I tried this several times, but found that the smooth tents would slip out of the cervix as soon as the forceps were withdrawn, unless they were pushed beyond the internal os, which required the deep introduction of the forceps and often resulted in the removal of the tent with the forceps. I thought some kind of tube would be serviceable, and on inquiry at Mr. Schmidt's, the instrument-maker, found an instrument devised by Dr. Barker, for the introduction of ointment into the uterus which seemed to answer the purpose (see Fig. 147). I soon found that in order to introduce the tube and expel the tents with one hand I needed a hold on the handle of the tube for thumb and two fingers, and consequently had the instru-

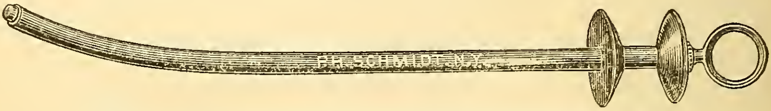


FIG. 147.—Tube for introducing medicated tents into the uterus. (P. F. M.)

ment shown in Fig. 146 constructed, which answers the purpose admirably. Two tubes were made for the two sizes of tents. The tube is of hard rubber, slightly bent to permit its easy passage to the internal os. The instrument can be used without a speculum, or through a large tubular, or bivalve, or a Sims speculum. I prefer to use it through a speculum in order to place a tampon over the os afterward. Before exposing the cervix through the Sims, I place the tent in the tube, push it forward toward the uterine end, and then, seizing the instrument in my right hand, with the thumb in the ring and the two first fingers grasping the tube at the broad flange, I insert the end of the tube into the cervical canal and push it forward as far as it will go. Holding it steadily in the cervical canal, I push forward the piston and do not withdraw the tube until the piston is pushed home. I can then be certain that the tent has been forced through the internal os into the uterine cavity. If I were to withdraw the tube as I push the piston forward, the tent would probably be but partially inserted. The length of the tent is made to correspond to that of the uterine cavity, and its pliability prevents injury to the endometrium. In order to prevent the dissolved tent from escaping from the external os and burning the vagina and vulva, and also to insure its full effect on the endometrium, I am in the habit of introducing a cotton plug into the cervix with Sims' slide-applicator. This the patient removes by the attached string on the following day, and then uses the common hot or cleansing vaginal injection. The tents are generally introduced in the office, and the patients allowed to go about their usual avocations. In ordinary uteri I use the smaller sized tents; in uteri with dilated cervical canals the larger size, sometimes even introducing two tents at one sitting. To do this, both are passed into the tube at once, one after the other, and the first tent having been deposited in the uterine cavity as seen by the length of piston still exposed, the point of the tube is turned slightly to one side, and the second tent placed beside the first.

I have introduced these tents many times and have never seen more than very slight suprapubic burning follow. In no case was either the introduction of the tent or the after result painful or productive of unpleasant consequences. Some of the gynecologists who have used them speak of uterine colic following them, but I have not seen it in my practice. The tents may be introduced every other day, or twice a week, as the case requires. The following list of medicated tents comprises all those made by Spangenberg & Boettcher, 699 Sixth Avenue, New York, together with the quantity of the agent in each tent:

LONG TENTS.

4½ inches long, ⅛ inch thick, 20 grains weight.

Iodoform, 25 per cent., 5 grains.
Iodoform, 5 grains; tannin, 2½ grains.
Iodoform, 60 grains; sulphate of zinc, 10 grains—in 12 tents.
Iodoform, 30 grains; extract of belladonna, 6 grains—in 10 tents.
Ergotine bonjeans, 10 grains.
Extract opii aquos, ½ grain.
Extract opii aquos, 1 grain.
Extract opii aquos, extract of belladonna, alc.—1 grain of each.
Iodine, 6 per cent. strength of tincture.

SHORT TENTS.

2¼ inches long, ¼ inch thick, 20 grains weight.

Iodoform, 5 grains.
Iodoform, 5 grains; tannin, 2½ grains.
Iodoform, 60 grains; sulphate of zinc, 10 grains—in 12 tents.
Iodoform, 30 grains; extract of belladonna, 6 grains—in 10 tents.
Iodine, 6 per cent. strength of tincture.
Iodine, 10 per cent.
Iodine (Churchill's solution), 3 grains.
Iodine, 6 per cent.; carbolic acid, 3 per cent.
Extract opii aquos, 1 grain.

LONG TENTS.

Iodine, 10 per cent.
Iodine, 6 per cent.; carbolic acid, 3 per cent.
Carbolic acid, 10 per cent.
Muriate of hydrastin, 5 grains.
Muriate of hydrastin, 2 grains; copaivæ, 2 drops.
Fluid extract of hydrastis, 20 drops.
Tannin, 12 per cent., 2½ grains.
Tannin, 2½ grains; sulphate of zinc, ¼ grain.
Sulphate of zinc, ¼, ½, and 1 grain each.
Tannin, 2½ grains; opium, ¼ grain.
Sulphate of zinc, ¼ grain; sulphate of morphine, ⅛ grain.
Sulphate of zinc, ¼ grain; sulphate of morphine, ⅛ grain; copaivæ, 2 drops.
Sulpho-carbolate of zinc, ½ grain.

SHORT TENTS.

Extract opii aquos; extract of belladonna, alc.—1 grain of each.
Fluid extract of thuja occ., 50 per cent.
Tannin, 12 per cent.
Ergotine bonjeans, 10 grains.
Extract of belladonna, alc.; sulphate of morphine—½ grain of each.

The price of these tents is as reasonable as can be expected. The manufacturers express their readiness to make tents according to any formula desired.

Of the tents contained in the list I have used only those containing iodine, iodoform, carbolic acid, tannin, sulphate of zinc, ergotine, and the combinations of two or more of these drugs. Those of iodine, iodine and carbolic acid, iodoform and sulph. zinc, tannin and sulph. zinc, I have found most serviceable. The narcotic agents are the least essential of the list, as they act better per rectum.

As regards the efficiency of these medicated tents, I think that for a gradual effect, an effect produced to a certain degree, by absorption of their ingredients, they excel fluid applications. For a direct styptic effect, however, they are far inferior to the uterine plug soaked in tincture of iodine and left in utero. Therefore, when a rapid, sharp effect, either for hemostasis or with an irritant object, is intended, the introduction of fluids on cotton-wrapped applicators is preferable. For subinvolution, hyperplasia, and chronic endometritis the tents are superior.

I have already mentioned the tents made by rubbing up tannin and glycerine. They are very neat, but I found, when I used them years ago in Scanzoni's clinic, that they did not dissolve readily and produced uterine colic. They would do very good service in endotrachelitis; but beyond the internal os they were too irritating. Dr. Leblond, of Paris, highly extols crayons of iodoform for superficial ulceration of the endometrium. The formula is: Iodoform, 10 grammes; powdered gum arabic, 1 centigramme, mucilage, q. s. to make a pilular mass. Divide into four equal cylinders, 4 centimetres long, and dry in the air for twenty-four hours. I have used these crayons, and certainly saw no pain follow them, therefore suppose they were dissolved. For many years it was the custom here and abroad to introduce the solid stick of nitrate of silver, or of equal parts of nitrate of silver and nitrate of potash, into the uterine cavity and drop it there to melt at its own leisure. I have seen many such sticks of the nitrate pushed into the uterus with the "uterine pistol" (an instrument resembling my bougie-tube) for endometritis or "chronic metritis" in Braun's clinic in Vienna, and as many women writhing and groaning with uterine colic for an hour or more afterward. It probably was efficient treatment—it certainly was painful enough to do good; but I think it was rather too dangerous to be justifiable as a routine practice. I have already expressed my opinion of the solid nitrate of silver as an application to the uterus, and am glad to say that with us it is no longer practised. Solid sticks of the sulphates of copper and zinc, fused and cast in thin molds, have been introduced in the same manner; but I, for my part, am afraid of these strong applications in solid form. They may cure, but they may also kill.

The introduction of fluid medicines into the uterine cavity contained in gelatine capsules has been recommended by Sale and others, who pushed the capsules beyond the internal os with forceps. I do not believe that this recommendation has been generally followed, although I think the plan a good one, especially if the capsules can be introduced by means of a piston-tube.

Sponge-tents have also been impregnated with drugs in solution (chiefly carbolic acid, zinc, and copper solutions) which, of course, exerted their local or general effect when the sponge became permeated with fluid from the tissues of the uterus. I have frequently used carbolic acid in this way, dipping the tent into the acid immediately before inserting it; indeed, all sponge-tents now made are carbolized.

5. *Ointments.*—Any of the drugs used for intra-uterine medication, which permit of being rubbed up with lard or vaseline, can be applied to the endometrium through a wide-mouthed syringe or piston-tube. Such instruments have been devised by Barker, Barnes, Lente, and others, and the method is well spoken of by these gentlemen. It seems to be especially applicable to those cases in which a gradual action and absorption of the agent is desired. For caustic styptic and stimulant effects this method is evidently not appropriate, as the dilution of the agent by the vehicle softens its action. Thus, the iodine compounds, mercurial ointment, nitrate of silver would do good service in hyperplasia and endometritis, if applied in this form.

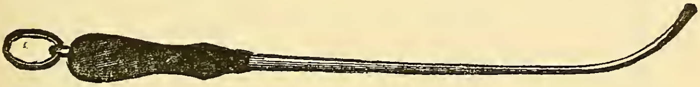


FIG. 148.—Barker's ointment syringe.

6. *On a caustic-holder.*—In order to cauterize the endometrium with the solid nitrate of silver, and to avoid the excessive effect from a long contact of the agent with the surface (as results when the stick is deposited in the cavity from a tube and left to melt there), various caustic-holders have been devised, which, like those of Scanzoni, Chiari, and Lallemand, either carry the stick of the nitrate into the uterine cavity, or (like that of Barnes and Lente) are coated with the fused agent and then inserted. In either case the agent is applied to the whole endometrium by moving the point of the caustic-holder about in the cavity, until every portion is thought to be touched, and then withdrawing it.

Where it is indicated to use the solid silver-nitrate, this method is unquestionably preferable to leaving the stick in the uterine cavity. I am under the impression that in this country intra-uterine applications are but seldom made in this manner. The caustic-holders are introduced through a speculum like a sound. The effects are likely to be more severe than those of fluid applications. An ingenious and practical method of applying the solid nitrate of silver to the uterine cavity for endometritis has been devised by Dr. S. S. Boyd, of Dublin, Indiana (*American Practitioner,* October, 1880). He cuts a small silver female catheter in two, so

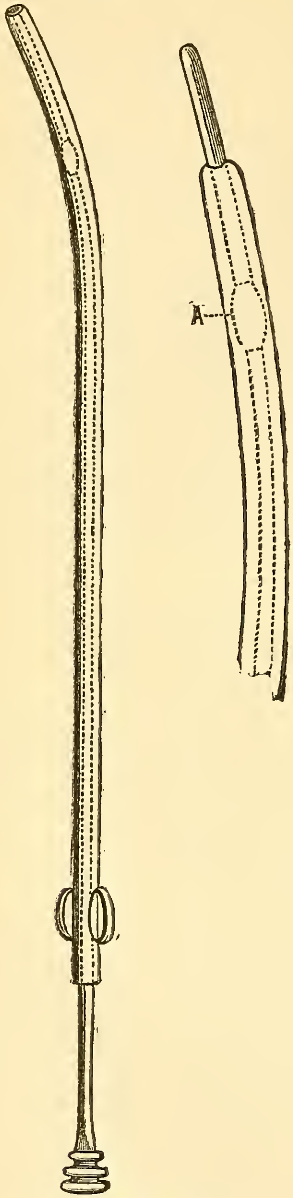


Fig. 149.

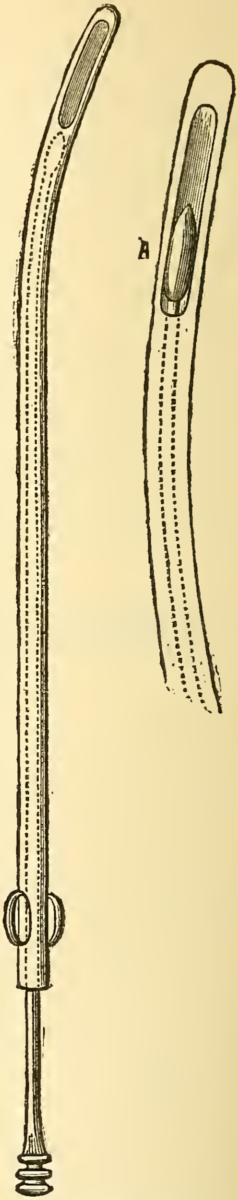


Fig. 150.

Fig. 149.—Barnes' tube for depositing fused sticks of sulphate of zinc or nitrate of silver in uterus: A, piston pushing out stick.
Fig. 150.—Barnes' uterine ointment depositor: A, piston pushing out ointment.

as to have three inches of the closed or distal end in one piece. In three-fourths of this closed end he has as many perforations made as possible without materially weakening the instrument, and to the open end of the tube a ring is soldered to which a small cord is attached. After leaving a slippery-elm tent in the uterus overnight in order to somewhat dilate the uterine canal, he places grs. xv. of coarsely pulverized nitrate of silver in the tube, and confining it there by pressing a little cotton on it, he removes the tent and inserts the charged tube through the speculum into the uterus until the tube touches the fundus. The cord is left hanging from the vulva in order that the patient may remove it if serious pain is felt. This tube is left in utero for three to four hours, when the nitrate of silver has been dissolved, and is then removed. By this method, used once a week for four weeks, a patient who had suffered from chronic endometritis for five years, and had been treated by him for two and a half years locally and generally without success, was cured in less than six weeks.

7. *Powders* have been blown into the uterine cavity, by means of an insufflator (see Fig. 120), by Clay, Gautier, Gubler, and others. Iodoform, tannin, alum, are the principal agents which can be introduced in this manner. But their application is by no means as practical beyond the internal os as to the cervical cavity. The mouth of the insufflator is very liable to be clogged by mucus, and the removal and reintroduction of the tube demanded. So far as I know, this method is not used for intra-uterine medication, any more than the

8. *Spray*, which is more efficient and practical. It was recommended some years since by Dr. Edward Bradley, of New York, for the uterine cavity, he having used it with benefit in the bladder. There can be no doubt of the practicability of the method if the uterine cavity is fairly dilated; but what the effect would be of a gust of air blown into and distending the normally collapsed cavity, remains to be seen. It is certainly possible that the shock therefrom might be quite as severe as from an intra-uterine injection. Still, I think the method has not been sufficiently, if at all, tested, and might, in properly selected cases, and used very gently, prove highly useful. The instrument would be a long sound-shaped perforated tube attached to an ordinary spray bulb and glass.

The comments attached to each of the methods described will have made it apparent which form of intra-uterine medication I prefer, as combining the highest degree of efficiency, facility, and safety. With a moderately dilated cervical canal, I unquestionably prefer the cotton-wrapped applicators; when the canal is of normal width, the medicated tents introduced through a piston-tube; but when the passage has been dilated by artificial means and admits the introduction of at least the little finger, the most satisfactory, safe, and rapid method is to pass a straight cotton-wrapped stick soaked in the fluid directly to the fundus. In any case, the effect is immensely enhanced by leaving a cone of cotton soaked in the fluid in the uterine cavity until the organ itself expels it, or the discharge from the cauterized endometrium loosens the cotton and permits its easy removal.

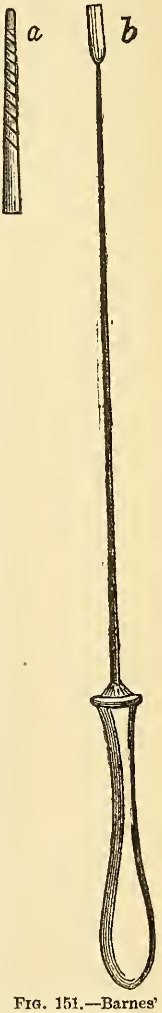


FIG. 151.—Barnes' nitrate of silver applicator: *a*, roughened tip; *b*, coated.

The choice of the agent and the method depends, therefore, chiefly on the indication for local treatment and the condition of the uterine canal, but is very often influenced by habit and individual preferences on the part of the operator. Thus some gynecologists prefer iodine (styptic, alterative) and impure carbolic acid (stimulant, irritant) for all the cases in which intra-uterine medication is indicated. Emmet is one of these, and I confess myself, to a certain degree, of the same opinion. Others praise the solutions of the salts of iron, and pure carbolic or pyroligneous acid, for the same purposes, respectively. Others, again, following the lead of Lombe Atthill, of Dublin, believe that fuming nitric acid is *the one* agent for all forms of intra-uterine medication. So far as efficiency goes, I certainly agree with these last named, and also as regards the comparative safety of the agent. But, there are very many cases in which milder means will answer quite as well, and in which it is scarcely proper to risk converting the endometrium into a cicatricial surface unless those milder measures fail. The true and really scientific way in the choice of agents and methods for intra-uterine medication is to adapt the nature and strength of the remedy to the severity of the disease; to try the effects of mild measures before resorting to extreme means, and to change the remedy if a fair trial shows its inefficacy. We are prone to become wedded to one peculiar practice or remedy which has always served us fairly, and to be averse to trying others which might do much better.

Precautions.—The general rules to be observed for all methods of intra-uterine medication are: 1. Clearly specify the indication and select the remedy accordingly. 2. Eliminate all counter-indications and elements of danger. 3. Choose the method which can be most thoroughly, safely, and rapidly employed in the given case. 2. Dilate the cervical canal before making the application, if such a course appears necessary to thoroughness. 5. Begin with mild applications until the sensitiveness of the uterus is tested. 6. Make the first application, when possible, at the house of the patient, and keep her in bed or in a recumbent position for at least several hours afterward. 7. Enjoin upon all patients, after every application, to avoid violent exercise or exposure to cold during the remainder of the day. 8. Use the powerful caustics (nitric and chromic acid, iodized phenol) only after dilatation of the cervical canal and at the house of the patient, keeping her in bed for at least twenty-four hours after, and, if necessary, giving her opiates to relieve pain and possible inflammatory reaction. 9. Repeat the milder applications every day, or other day, or twice or once a week, accordingly as the symptoms call for repetition; the stronger agents only after separation of the slough, if still necessary, and if not required, complete the cure by the milder agents. 10. Protect the cervix and vagina by specula, cotton, and tampons, and by mopping up all excess. 11. For styptic, alterative, and absorbent purposes, iodine (pure or compound) and iodized phenol are the best agents; for a styptic effect alone, the sol. ferri persulph. or perchlor., mixed with glycerine; as a caustic, the pure nitric acid; as stimulants, pure and impure carbolic acid, plain or with glycerine; as an anesthetic and alterative, iodoform. 12. Occasional changes of remedies will, in chronic cases, hasten a cure, and entire cessation of local treatment for a week or more, every now and then, is often beneficial in giving nature an opportunity to repair the injury. If a wound or living surface is constantly irritated, it very naturally is unable to return to or preserve its normal condition, and the very means then which are intended to cure, serve to maintain the unhealthy condition. 13. Always tell the patients that only perseverance will result in recovery, and that a too early cessation of treatment will surely be followed by a relapse.

Counter-indications and Dangers.

The same conditions which prevent the use of the sound or probe will, to a greater degree, counter-indicate applications to the endometrium. All acute and subacute inflammatory conditions of the uterine substance or adnexa, are absolute counter-indications. All such conditions in which no evidence remains of the inflammation but a tenderness of the thickened parametrium on pressure, so-called "chronic parametritis and perimetritis," will admit of applications, if the gain is proportionate to the risk of lighting up the inflammation. When the uterus is fixed, and the inflammatory residue is so old as to be cartilaginous or cicatricial, no particular harm can come from swabbing the endometrium. But special care should be taken to eliminate every case in which pressure in the vaginal vault causes decided pain, or where the history of the case gives a tendency to febrile reaction, after every local interference. When I speak of inflammation as a counter-indication, I mean of course, inflammation of the substance of the uterus, and of the peritoneum and cellular tissue surrounding it ; not of the mucous membrane, which is precisely one of the conditions we desire to cure by applications.

Uterine hemorrhage does not constitute an objection, when it is this very symptom which we are consulted for. I constantly apply tincture of iodine to the endometrium during hemorrhage, either profuse menstrual, or intermenstrual, when general remedies fail. The objection to an examination so frequently made by these patients, that they are flowing, is precisely the reason why they should be examined and its cause ascertained, and if this fails, the flow should be arrested by local means, either repeated vaginal tamponing, or intra-uterine applications, or both.

The *danger* of these applications appears from the foregoing remarks, viz., the lighting up of a fresh or the rekindling of an old, pelvic peritonitis or cellulitis. There can be no question that this danger is run with every application beyond the internal os. But out of several thousand applications of the kind, the agents chiefly used being tincture of iodine and carbolic acid, with a fair number of strong nitric acid, I have but one instance in which an inflammatory reaction followed; and even in that case, the dull curette which was first employed, may fairly bear its share of the blame.

The usual sensation felt after any intra-uterine application, is that of a warmth, a glow, in the suprapubic region. This lasts from several minutes to several hours. Not unfrequently my patients have complained of suprapubic soreness for a day, or there has been actual pain for the same time. Uterine colic (sharp contractile pain) was rare, and usually in cases where the internal os was narrow, and coagula or albuminates were retained in utero. In three cases only did I experience decided shock: 1. After application of strong nitric acid through the applicator-syringe in an undilated uterus, at the home of the patient, who collapsed decidedly, and required repeated stimulation with brandy and ammonia, and hot bottles all about her, before reaction set in; no further bad results followed. 2. After the introduction of a solution of nitrate of silver, ʒ j. to ℥ j. by the applicator-syringe in chronic endometritis. Normal cervical canal; hysterical patient; severe uterine colic; collapse; vomiting; brandy and hypodermic of morphine; able to leave office in carriage after two hours; confined to bed for several days by abdominal pain, but nothing further. 3. After application of Squibb's impure carbolic acid, by applicator-syringe in my office. Uterine canal, normal; collapse, syncope, lasting half an hour, no stimulus needed, no bad results. These three cases all occurred after the use of the applicator-syringe, and the shock may therefore possibly have been due to the rapid saturation of the cotton, and escape of a few drops into the uterine cavity. I certainly have seen no such symptoms follow the use of the ordinary cotton-wrapped applicator.

At a discussion on Intra-uterine Medication, held at the fourth annual meeting of the American Gynecological Society, in Baltimore, in September, 1879, so careful and experienced an operator as Dr. William Goodell, of Philadelphia, expressed his growing satisfaction in the use of intra-uterine injections, which he makes with Buttles' syringe, throwing in carefully four to eight drops of pure carbolic acid, or iodized phenol, with a small amount of hydrate of chloral added. He receives much better results from these injections than from applications, and taking care to have the canal always patulous, fears no bad consequences therefrom. Dr. Goodell's experience certainly should carry great weight with it. But in the discussion referred to he was almost alone in his recommendation of intra-uterine injections, the large majority of the gentlemen present, all men of large experience, expressing themselves decidedly against them. In France Leblond has recently reported a small series of cases in which they were used without danger and with success. But he, like Goodell and all who use or permit them, makes a widely patulous uterine canal a *sine qua non;* and that being present, as already stated, I should prefer to do away with all risk and swab out the cavity with the straight cotton-wrapped stick, either unguarded or through a straight metal or glass canula.

As regards the danger of producing inflammation by the application to the uterine cavity of strong nitric acid, I am disposed to agree with Atthill, who believes it to be as safe as it is efficient. Only once have I seen a reaction follow the thorough repeated swabbing of the endometrium with nitric acid, even after the superficial portion of the hyperplastic mucous membrane had been removed with the dull curette, when the uterine canal has been so freely dilated as to readily admit the cotton-wrapped stick and allow the escape of the secretions. The immediate pain of the application even hardly exceeds that of iodine or carbolic acid. In the one exception referred to, a pelvic cellulitis followed the curetting and application to the endometrium of nitric acid.

Besides the immediate danger of inflammation, there is a secondary accident to be feared from the most powerful applications, the escharotics, only, and that is the cicatricial contraction of the internal os, the sealing-up of the uterine cavity. Barker and H. P. C. Wilson report cases of this accident after nitric acid; the constriction of the external os following the solid nitrate of silver has been already referred to. I have seen no such result after nitric acid in any of my cases, but can readily understand how it might occur. Avoidance of too deep and too frequent cauterization, and frequent sounding of the uterine canal for some time after, will usually prevent such stenosis.

Therapeutic value.—After this long and elaborate discussion of intra-uterine medication, it may seem strange that I should think it necessary to say anything as to the therapeutic value of this treatment. But, in spite of the universal employment of the various methods described, and the ease with which the results of the treatment can be controlled and estimated, weighty authority still seems to doubt their reputed efficacy. At the meeting of the American Gynecological Society above referred to, the President, Dr. T. G. Thomas, expressed himself as follows: "While intra-uterine medication beyond the internal os is in many cases exceedingly beneficial, I feel fully impressed with the idea that, as a general rule of practice, it is much more honored in its breach than in its observance." He then goes on to explain this opinion by saying, that uterine catarrh usually depends on conditions not inherent to the mucous membrane of the cavity itself, but consisting in displacement, subinvolution or hyperplasia of the uterus, laceration of the cervix; or the catarrh may be due to fungoid development of the mucous membrane. The proper method to cure the catarrh in these cases is to remove its primary cause, rectify the displacement, reduce the hyperplasia, stimulate the uterus to involution, sew up the cervix, curette off the fungoid growths of the mucous membrane. He then admits the presence of idiopathic endometritis, but omits to tell us how he cures it, although admitting the propriety of intra-uterine medication in these cases. What Dr. Thomas says as regards first removing the cause of the endometritis is very true, and the only rational mode of procedure; but, how are we to relieve the hyperplasia, or cure hemorrhage in which the curette fails to show the presence of fungoid or granular degeneration of the mucosa; or stimulate a torpid uterus to involution or menstruation, without, at the least, the assistance of intra-uterine medication? While I do not go so far as Dr. Goodell, who passes every application to the fundus, even though there is no evidence that the catarrh extends beyond the internal os, and while I believe that the disease is in many cases confined to the cervical cavity, and the medication, therefore, need not be carried higher up, I am compelled to confess that I fail to see how the numerous cases of chronic endometritis, hyperplasia, subinvolution, hemorrhage depending on pulpiness or flabbiness of the endometrium, can be cured without local applications to the uterine cavity. Of the value of local cauterization of malignant growths in the uterine cavity there can be no question, although of course such treatment is but palliative.

VII. Dilatation of the Uterus.

In the chapter on Examination I have already spoken of dilatation of the uterus for diagnostic purposes. How to accomplish this dilatation not only for diagnosis, but also, and chiefly, as a means of treatment, is the subject of this section.

An indispensable condition to all measures for dilatation of the uterine canal is the patency of the vagina and accessibility of the cervix. In the absence of this condition, the dilatation of the vaginal canal by tampons, specula, bougies, expanding instruments, and the employment of means calculated to increase the mobility of the uterus (iodine to vaginal vault, traction on cervix), should necessarily precede the attempts at expansion of the uterine canal.

The operation of opening up the uterine cavity to the finger and instruments may properly be divided into two main sections, accordingly as the dilatation is performed with or without cutting instruments. I shall first describe the various methods without cutting instruments, and then speak of the operation for opening the uterine cavity with knife or scissors, the so-called "bloody" dilatation of the canal, in contradistinction to the other "bloodless" procedure. The cutting operation is naturally a rapid and immediate method.

Dilatation without Cutting Instruments (*Bloodless Dilatation*).

Methods and Instruments, and How to Use Them.—There are two methods of dilating the uterine canal without knife or scissors, and they differ simply in the degree of rapidity with which the dilatation is accomplished.

a. *Rapid dilatation* (that is, within fifteen minutes, and at one sitting) is effected by means of graduated sound-like instruments, which are forced through the uterine canal one after the other; or by steel two- or three-branched instruments, which are introduced closed and then expanded by an external mechanism; or by tubes or bags of rubber which are inserted in a collapsed condition, and are then inflated with air or water; or by the finger.

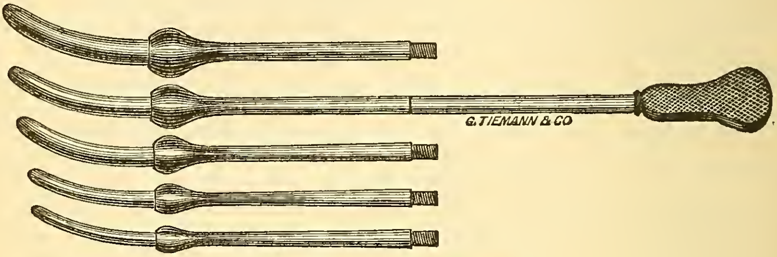


FIG. 152.—Peaslee's uterine dilators.

Graduated sounds.—In 1870 the late Dr. E. R. Peaslee devised a series of graduated metal sounds which were arranged to screw into one handle. Their appearance is shown in Fig. 152. There were either five or three in the set. Later these dilators were made of hard rubber. Dr. Horace T. Hanks modified them slightly by placing two dilators of different size on one handle, and making eight sizes instead of five. Both these instruments are but modifications of the old dilators of Simpson, of which there were twelve in a set. They were destined to be left *in situ* for an hour or more, and the handle is therefore provided with a slide by which the dilator can be detached when it has been introduced. A tampon keeps it in place, and it is withdrawn by the string attached to it. All these dilators are provided with a circular enlargement at a distance of about two inches from the point to prevent their too deep insertion. These sound-dilators are introduced in the following manner: Through the speculum (large, tubular, valvular, or Sims) the cervix is seized with a stout tenacu-

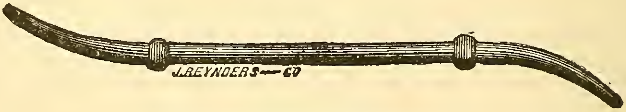


FIG. 153.—Hanks' uterine dilator.

lum (best a double tenaculum) which seizes one lip of the cervix between its blades, and the uterus is slightly drawn down and straightened. The direction of the uterine canal having been ascertained by the sound or probe, the smallest-sized dilator is inserted into the os and forced upward toward the internal os, the cervix being steadily held by the tenaculum. As soon as the whole dilator has been introduced, it is allowed to remain a few moments, then withdrawn and the next size forced in, and so on until the desired amount or the limit of dilatation has been reached. The last dilator may be allowed to remain in utero for fifteen minutes or longer, or, if only temporary dilatation is desired, may be removed at once when the desired degree has been accomplished.

This maneuvre may be practised in the office or outdoor clinic, if it is not attended with too much pain or the degree of dilatation desired is not very great. The ease with which the dilatation succeeds depends entirely upon the amount of elasticity and density of the uterine tissue. Some uteri are dilated with scarcely any force, others resist even the most persistent efforts. Upon this degree of resistance will depend, to a great extent, the amount of pain experienced by the patient, and the consequent advisability of performing the operation at the home of the patient, putting her under an anesthetic, and keeping her in bed for a day or two after. If a permanent and very thorough dilatation is intended, the latter precautions are certainly advisable. I have frequently practised dilatation on outdoor patients, but have never been able to obtain more than a moderate and temporary result unless the patient was anesthetized.

If a sufficient dilatation and the desired object are obtained at one sitting, of course it need not be repeated; but if a systematic gradual dilatation of the uterine canal is intended (as in stenosis, sterility, dysmenorrhea, flexion), the sitting should be repeated every day or two, according to necessity and the endurance of the patient.

A very thorough expansion of the uterine canal can certainly be accomplished by these graduated sounds, provided the tissue of the uterus is not too dense and a sufficiently firm hold can be secured of the cervix to resist the forcible upward motion of the sound. And these two points are precisely the great objections to these instruments. The force required to thrust the sounds through the narrowest portion of the uterine canal, the internal os, and the part immediately above it (the isthmus uteri of Spiegelberg) is usually very great, so great, indeed, that the cervix is very liable to be badly torn by the tenaculum. And only when the tissue is but moderately dense and fairly elastic, is it possible to pass any but the smallest-sized dilators. This is especially the case in the long conical cervices of nulliparous women, in whom this method of treatment is specially indicated. It is evident that a certain degree of force is required to pass even a wedge through a movable body, and the amount of traction necessary to counteract this force and steady this movable body, must, of course, be proportionate. The constriction once overcome, however, and the uterus thoroughly dilated, the result is usually a more permanent one than when the branched dilators are used.

The degree of dilatation differs with the indication. If it is desired to introduce the finger, of course that size must be obtained, and several daily sittings are often required. If it is merely intended to open the canal sufficiently to allow the more ready escape of the menstrual fluid, or the entrance of the spermatozoa, a dilatation up to one-fourth of an inch is all that is necessary. In the latter cases the treatment, in order to achieve permanent results, generally requires to be continued for some months, the sittings being gradually diminished until the permanent patency of the canal renders them no longer necessary.

The uterine canal, as a rule, contracts very rapidly after dilatation, and such cases in which it is desired to maintain the canal at a certain dimension need frequent revision, and, as the occasion may be, corresponding repetition of the treatment. Thus in dysmenorrhea or sterility with hard, long, slender cervix, and narrow, perhaps flexed, canal, the dilatation may require to be repeated every day for some weeks, and once or twice a week for several months before the canal remains permanently open.

In order to avoid the laceration of the cervix which almost invariably ensues from the tenaculum when any considerable force is required to pass the sound dilators through the cervical canal, Fritsch, of Halle, has recently recommended a method of introducing these dilators which is certainly original and I should think, effective. He uses steel sounds, the thinnest of which has a diameter of 0.5 mm., the largest 15 mm., with three intermediate sizes, 7½, 9½, 12½ mm. He puts the patient under chloroform, and having explored the way with the sound in the ordinary manner (the patient on her back, without speculum) he inserts the point of the sound into the cervical canal, and supporting it with the intravaginal finger, presses it firmly upward in the direction of the internal os, at the same time the outer hand grasps the fundus uteri and steadily pushes it down over the sound, as a glove is slipped over the finger. This sound is then replaced by a larger one, and so on. Fritsch admits that the force needed to accomplish this is very great, and would be entirely unjustifiable if the uterus were not well watched by the outer hand. But he is no doubt right in asserting that such a force is allowable when applied in this manner, and succeeds in its object, while a lesser force applied without the assisting outer hand would fail or be injurious. The great point about this plan is that the dilator is not forced into the uterus, but the latter pushed over the dilator. Fritsch goes so far as to discard all methods of slow dilatation when the object is merely to dilate the uterus. He has witnessed no bad results from the force employed. The plan seems to me an excellent one, far superior to the old method of forcing the dilators up through the speculum, while the tenaculum holds the cervix. It would probably be feasible only in those cases in which the fundus can be plainly mapped out by palpation, and grasped by the outer hand; in stout people, or with very rigid abdominal walls, this would not be possible. But in cases where an angle of flexion forms an obstacle to the dilator, the manipulation of the uterus by the outer hand would straighten the canal and facilitate the passage of the internal os. I have repeatedly succeeded in introducing a stem-pessary in this manner when it was impossible to get it through the flexed canal in the usual manner (on a stylet through a Sims speculum). It would probably be necessary to have

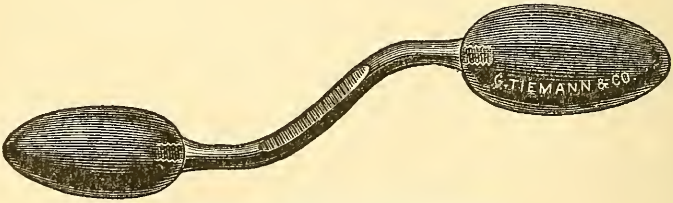


FIG. 154.—Hanks' large cervical dilators.

the sounds all made of steel and in one piece for this method, in order to insure sufficient stiffness and inflexibility.

For the rapid dilatation of an already partly dilated cervical canal, as at the beginning of a miscarriage, or in rigidity of the external os during labor at term, or for the removal of intra-uterine polypi and fibroids, Dr. Hanks has had constructed a series of much larger, olive-shaped dilators of hard rubber, which are attached to a handle by a screw, and are introduced through a speculum precisely like the smaller sizes. They are designed to take the place of Barnes' obstetric dilators, which often burst and are liable to spoil. The advantage of having an instrument by which the cervix can be immediately dilated when it is desired to remove a retained placenta after a miscarriage, can be appreciated only by those who have labored hard for an hour or more to effect this through a canal barely passable for one finger.

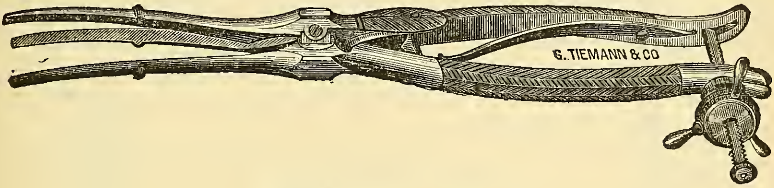


FIG. 155.—Sims' uterine dilator.

Steel-branched dilators.—The principle of construction and mechanism of all the instruments of this class is the same, viz., two, three, or four sound-shaped blades, which unite in one shaft, are introduced through the internal os in the closed condition, and are then separated by a contrivance in the handle to any desired width within the limits of expansion peculiar to each instrument. Instruments of this kind have been devised by Simpson, Priestley, Sims (three blades), Nott, Hunter, Elwood Wilson, White, Ellinger, Palmer, Miller, Ball, and various others. Those of Sims, Wilson, Ellinger, Palmer, and Miller are probably best known and most used by the profession.

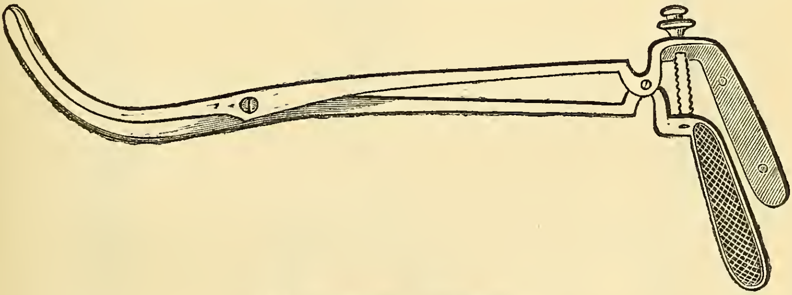


FIG. 156.—Wilson's uterine dilator.

That of Ball is, perhaps, the most powerful instrument of the collection. The mechanism of these instruments is plainly shown in the cuts.

The intra-uterine blades are two and one-half inches long, slender, rounded, and, when separated, parallel to each other, in order to secure an equal expansion of the internal os with the rest of the canal. But, as a rule, they feather slightly, and this is as it should be, to prevent a too powerful expansion at the most dangerous spot of the uterine canal. Those of Ball and Miller do not feather, and any of the others can be made perfectly rigid by simply increasing the size of the blades. The rounded point of the united blades should but slightly exceed in size that of the ordinary sound, so that any normal internal os can be passed by it. At the junction of blades and shank, there is an angle or expansion to show that the limit of the normal uterine cavity has been reached when this point is at the external os.

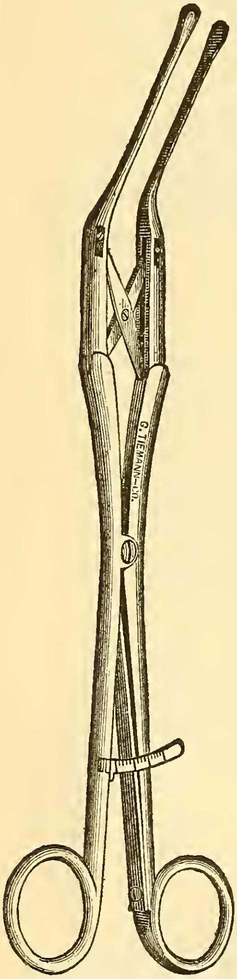


Fig. 157.—Ellinger's uterine dilator.

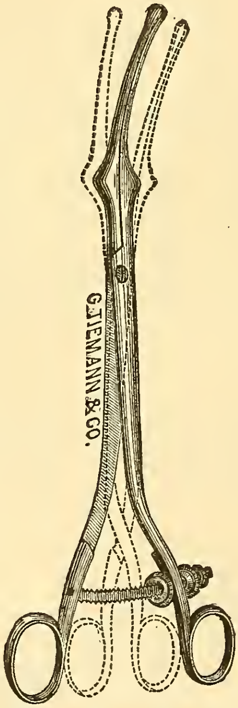


Fig. 158.—Palmer's uterine dilator.

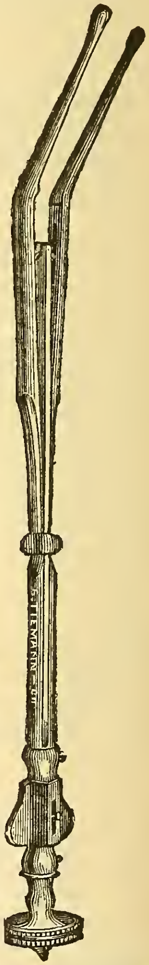


Fig. 159.—Miller's uterine dilator.

I have become so accustomed to Ellinger's dilator, which I brought with me from Stuttgart, the home of its inventor, that I prefer it to any of the others. But I think Miller's and Palmer's equally good instruments, and, as regards the screw-action by which the blades are separated, even superior. The curve of the blades possessed by Wilson's instrument is not needed to facilitate its introduction.

The limit of expansion of the blades is one inch to one and one-half inches, but this is seldom required. In ordinary daily practice one-half inch is the limit to which dilatation should or need be carried.

These dilators can be either introduced on the finger alone, like the sound, or through any speculum which is roomy enough to allow the manipulation of the handle generally necessary to guide the point through the internal os. In either case the direction and width of the canal should have been ascertained by the sound before attempting to introduce the dilator. If a speculum is used the cervix may be steadied by the tenaculum in the anterior lip, or it may be dispensed with if the uterus is not very movable. The dilator having been warmed and well greased, is inserted into the cervical canal, the right hand holding it between thumb and first two fingers like a pen, and when it has been introduced as far as the expansion or angle where the intra-uterine portion begins, the blades are gently separated either by approximating the handles, or turning the screw in the handle, in accordance with the construction of the instrument. In Ellinger's instrument the compression of the handles and expansion of the blades is regulated merely by the pressure of the hand, and is therefore liable to be more sudden, forcible, and unequal. The addition of a screw to the crossbar would be useful, and would enable the operator to maintain a certain amount of dilatation without active movement on his part. All the other dilators act by means of a screw in the handle. If a Sims speculum is used, the point of the dilator may be gently pressed through the internal os by resting the backs of the angle of the instrument (where the blades begin) against the blade of the speculum in the vagina, and using this point as a fulcrum. The point of the dilator will then usually slip through the internal os without further trouble. Care should be taken to use but very little force, else the point might suddenly strike against the fundus. If the internal os should prove too narrow, a smaller dilator must be used, or the smallest size of Hanks' sounds may first be inserted. But the arrest of the point by a pocket or rugosity in the cervical mucous membrane should not be mistaken for a narrow internal os. The sound will show the way.

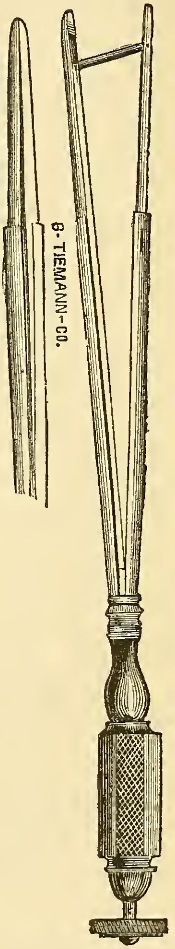


FIG. 160.—Ball's uterine dilator.

The amount of dilatation to be employed or allowed in any given case will depend upon the object desired, the sensibility of the patient, and the dilatability of the uterus. As a rule, in ordinary dilatation for the purpose of facilitating intra-uterine applications, and in dysmenorrhea and sterility, an expansion of the blades to the width of one-fourth to one-half inch is all that is required. Indeed, in many cases it is all that is feasible at one attempt, unless the patient be anesthetized. With Ellinger's and Wilson's dilators the amount of internal expansion can be read on the graduated crossbar at the handles; in the other instruments it must be guessed by the number of turns of the screw, as previously ascertained. When the dilatation has been maintained for a few minutes, the number of which depends upon the permanency of the result desired (three to fifteen under ordinary circumstances), the instrument is closed and withdrawn. If there is any hemorrhage, the vagina is cleared of the clots with cotton on a dressing-forceps, and a few flat tampons may be introduced, if thought advisable. The patient should be directed to remain quiet for the remainder of the day, and particularly avoid exposure to cold.

The pain experienced during this operation corresponds to the amount of dilatation and the sensitiveness of the patient. It is generally quite acute so long as the blades are still being expanded, but soon subsides when they are kept immovable, and rarely continues after the instrument is withdrawn. It certainly is very much less than that endured during dilatation with the graduated sounds; at least that is my experience. Occasionally the pain lasts during the remainder of the day.

As a rule, it is not necessary to anesthetize the patient, certainly not, when no greater expansion than one-fourth inch is desired. Therefore, the operation may be performed in the consulting-room or outdoor clinic, and I have so done it hundreds of times, keeping the patients for half an hour afterward and then sending them to their homes, often miles away. In no instance, was a bad result (inflammatory reaction, flowing, shock) reported to me after this treatment; and I would certainly have heard of it had such an accident occurred.[1]

When more thorough dilatation is intended, the operation should always be done under anesthesia at the home of the patient, who should be kept in bed for several days and treated prophylactically (morphine, ice on abdomen) against possible peritonitis or cellulitis.

The frequency of this dilatation is subject to the same rules which guide dilatation by sounds, viz., the indication, and the endurance of the patient. I have repeated it three times a week for several months in dysmenorrhea and sterility, with decided benefit as regards the former difficulty and occasional relief of the latter.

An instrument of slightly different construction, and for only a partial purpose is that by Vanderveer, shown in Fig. 161. It is designed by its inventor especially for dilatation of the external os alone, hence its greatest expansion is nearest the handle. It has a probe-shaped point, and no doubt can be easily introduced. But I fail to see its peculiar advantage, since I can equally well dilate the external os with the other dilators, and in the large majority of cases dilatation of the external os alone would but imperfectly fulfil the indication. The trouble is more frequently at the internal orifice, and besides, the external os can be stretched with

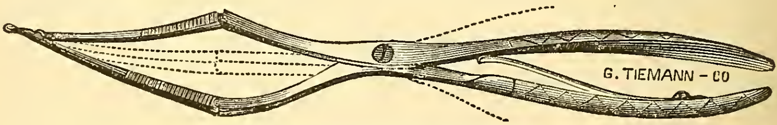


FIG. 161.—Vanderveer's cervical dilator.

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[1] Since this was written, one instance of profuse metrorrhagia from dilatation for anteflexion and sterility has come to my notice. There was also considerable parauterine tenderness, which subsided in a few days.

an ordinary dressing-forceps, or, what is better still, incised, as already described.

It may be stated that in an emergency (such as an application for hemorrhage, introduction of curette) the ordinary uterine dressing-forceps may be inserted and used as a dilator, if the canal is not abnormally constricted.

One of the great objections to these complicated dilators is the difficulty in keeping them clean. They should be washed in hot carbolized water after every operation, and kept well coated with vaseline to prevent rusting. Another objection is their expense, which, however, is, in my opinion more than counter-balanced by their utility. I should miss my dilator greatly in the treatment of sterility and dysmenorrhea, as well as in intra-uterine medication. The objection has been made to two-bladed dilators that they dilate only laterally, and therefore do not give the circular expansion which it should be our object to obtain. This is true; but in the first place, I do not think it so essential to have this circular expansion; secondly, we can obtain an expansion in every direction by turning the dilator so that it will expand sideways; and lastly, the thickness of the united blade of a three or four bladed dilator would prevent its use in very many of the cases where this convenient, rapid dilatation is most useful—those cases with long, conical cervices, narrow, and flexed uterine canals. If very thorough circular dilatation is required, we have other means, still to be described, at our command.

In flexions, it is a good plan to reverse the uterine angle or curve, and then dilate, thereby stretching fibres which would probably escape if the abnormal shape of the uterus is not altered, and giving the uterine canal a, at least temporary, different curve. In course of time it might result in a compromise between the primary angle and the reverse, and the normal mild curve remain. Besides, the ligaments are alternately relaxed and tightened by this maneuvre.

Sometimes, I think it advisable to alternately expand and close the dilator, turning it as I do, thinking thus to get a more uniform dilatation of the canal.

Rubber tubes and bags.—The instruments of this class consist of tubes and bags of soft rubber of different sizes, which are introduced in a collapsed state into the uterine canal, and there inflated with air or water. By introducing size after size, a very thorough dilatation may be reached in a short time. The objection to all instruments of soft rubber is that the rubber is very liable to become brittle and crack unless kept constantly moist. One may thus experience the annoyance of seeing one of these tubes burst during expansion.

The most serviceable contrivance of this kind is that of Molesworth, which consists of a series of four rubber tubes, the largest six inches long by one inch diameter, the smallest four and a half inches long by one-fourth of an inch thick. The dilating capacity of these tubes is at least double their undilated diameter. Each tube is provided with a flexible central guiding-rod of metal, by which a curve to suit the uterine canal can be given it. The tubes screw into a hollow metal rod six inches long, which again screws to the nozzle of a metal syringe, the piston-rod of which is provided with a screw-catch at the central end of the barrel, so that the piston can either be propelled rapidly, or, if the catch is fixed in pins at the barrel, slowly, by simply screwing the piston down until the limit of dilatation is reached. By this contrivance the tube may be expanded as rapidly or as slowly as the operator may desire. An escape tube of rubber guarded by a stopcock is attached to the nozzle of the syringe.

The manner of using this dilator is the following: The syringe is filled with water, usually warm; the dilating tube of proper size is well greased, the curve of the uterine canal (of course previously ascertained by the sound or probe) given it and it is screwed to the metal tube. Under guidance of the finger the dilator is then inserted into the cervical canal and through the internal os, which must, of course, be permeable to this extent. The syringe is then screwed to the tube, and the dilatation begun. In the uterine canal this dilatation should usually be slow and gradual, that is, by screwing down the piston-rod in the manner described. In the vagina, rectum, or when the uterus is softened and easily dilatable (as in abortion or labor) more rapid dilatation may be exercised; but the dense unyielding tissue of the non-gravid uterus will require more gradual force.

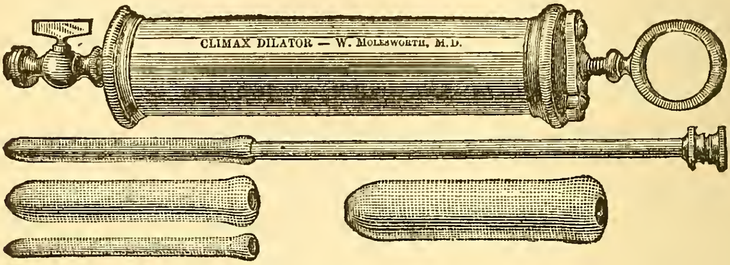

FIG. 162.—Molesworth's water dilator.

When the limit of dilatation has been reached, the stopcock is turned transversely and the reflux of water shut off. The dilator may then be allowed to remain in utero for as long a period as appears desirable to secure a permanent result; or, if the object was to dilate a rigid os during labor until uterine contractions expel the tube. If it is desired to inflate the tube with more water than the syringe holds, the stopcock may be closed and the syringe refilled from the vessel through the rubber tubing attached. (This is omitted in the diagram). On opening the stopcock again as much more water may be injected as appears desirable. The capacity of the largest tube is about one and a half syringes, that of the smaller tubes in proportion. After sufficient dilatation has been accomplished, the tube may be removed in its dilated condition, or, what is preferable, the water is withdrawn by the syringe and ejected through the side-tube. A stopcock in the hollow metal tube would be useful, as we could then close it and remove the syringe, leaving the dilator in place as long as desired. Now the stopcock is on the nozzle of the syringe, and the latter can therefore not be removed separately without allowing all the water to escape from the tube.

The one objection to this instrument (besides that belonging to all soft rubber instruments, of drying and cracking when not in use) is, that the greatest expansion of the tubes is at its middle, and that therefore the two ends, which come precisely where we want the most expansion—at the external and internal os—are but little dilated. When dilated the tubes have an ovoid shape and really only the three middle inches of the longest tube can be said to be thoroughly dilated. Now, in the elongated cervix of pregnancy, this deficient dilatation of the two ends of the tube entails a corresponding want of dilatation of that part of the uterine canal, and was the source of great annoyance and delay to me in a case of abortion at the third month. While the cervical cavity was widely dilated, both the internal and the external os, chiefly the latter, remained small, and the greatest difficulty was experienced in extracting the fetus and placenta through it. Another objection is that the flexible metal guiding rod in the tube reaches only to within half an inch of the end of the tube, which is thus enabled to double over and obstruct its introduction. A third objection is the expense of the instrument, which of course is enhanced by its liability to spoil unless frequently used. By keeping the tubes greased with vaseline, and frequently wetting and greasing the piston of the syringe, the instruments may be preserved for a long time.

In spite of these objections, I have found Molesworth's dilator an exceedingly useful instrument, one I should regret to miss in cases where a rapid, easy, thorough dilatation of an already somewhat patent, yielding canal is desired. It has done me excellent service in dilating the rigid os for the expulsion of the ovum or manual removal of the placenta in abortion, and in the first stage of labor; in stricture of the rectum; and dilating the female urethra. I have no experience with it in dilating the canal of the unimpregnated uterus, but should certainly expect equally good service from it in uterine polypi and fibroids, and in any case which admits the passage of the smallest tube.

An instrument for the same purpose has been devised by Emmet, and is shown in Fig. 163. Into the lower edge of the oblong rubber bag enters a rubber tube with closed end, which reaches to the tip of the bag, and through which a stout flexible sound is passed as a guide, in inserting the dilator. The bag is dilated by water injected through another tube, which has a stopcock. When the bag is partially dilated and retains itself, the sound in which it was introduced is removed, and additional water may now be injected as the case demands. Emmet has found this instrument useful, not only for completing the dilatation begun by sponge-tents or an intra-uterine tumor, but also for arresting hemorrhage by direct pressure. In ten or fifteen minutes, any necessary dilatation can usually be effected, especially if the parts have been prepared by a sponge or other dilating tent, or are soft and yielding.

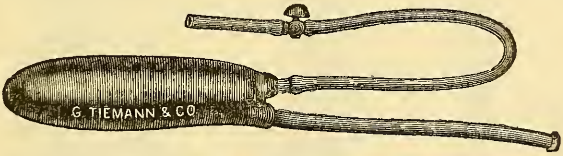

FIG. 163.—Emmet's water dilator.

Of the violin-shaped rubber bags, known as Barnes's dilators, it is not necessary to speak here, since they would be of but little service in gynecological practice, being too large to be introduced into a cervix which is not already pretty well dilated. They are especially intended for obstetrical cases.

The index finger can be used to dilate the cervical canal when the os is sufficiently patulous to permit the introduction of the first joint, and the uterine tissue is soft and elastic. When the uterus has the density and inelasticity peculiar to the normal unimpregnated organ, the finger will scarcely succeed in dilating it. In order to accomplish digital dilatation, counter-pressure on the fundus by the other hand is usually indispensable.

This dilatation with the finger comes into play most frequently when previous dilatation by bougies, dilators, or tents has prepared the way, or the canal has begun to contract again after such dilatation.

b. *Gradual dilatation* (*i.e.*, within twelve hours) is accomplished by porous substances shaped to fit the uterine canal, which gradually swell through imbibition of the fluids from the surrounding tissues. These porous bodies are called uterine *tents.* There are a number of substances from which these tents are made, those now in use being chiefly sponge, laminaria, tupelo, slippery-elm bark, elder and corn-stalk pith, gentian root. Of these, only the three first can be said to be universally popular.

Sponge tents.—If a piece of fine sponge is soaked in a solution of gum-arabic, or melted wax, and then rapidly compressed to its smallest limit, it will be found on hardening to have become a firm solid mass. If this sponge is now placed where the gum-arabic, or wax with which it is impregnated, will dissolve or melt, and where fluid can be absorbed by the sponge, the latter will rapidly swell and regain its size before compression. On this principle, the sponge is used to dilate the uterine canal, the vagina in stenosis, the rectum in stricture, the nasal cavity for the removal of polypi, and the canals of wounds when the removal of some body at the bottom of the narrow canal is desired. For use in the canal of the uterus, the sponge before compression is cut into cones of different sizes and

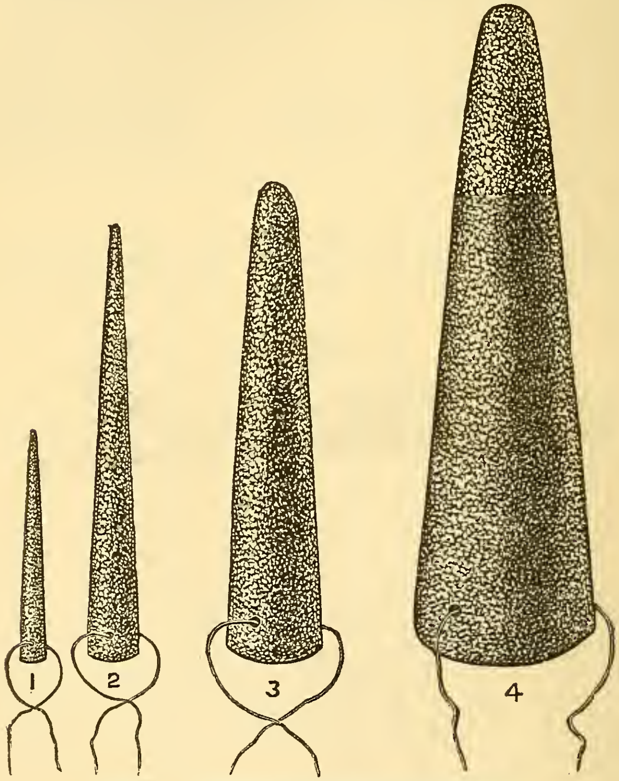

Fig. 164.—Different sizes of sponge tents. (Beigel.)

length, and when compressed the tents have the shape and appearance presented in Fig. 164. The compression is made by winding cord tightly about the moist sponge, which cord is removed when the sponge has hardened. The sponge tents found in the trade are all made in this manner. The surface of the tent is rendered smooth by sandpapering, and many tents are coated, besides, with a thin film of wax, or gum-arabic, which renders them more easy of introduction. Through the base of the tent a stout cord is passed, by which it can be withdrawn.

There are many sizes of sponge tents furnished, varying from that of a knitting-needle, to that of the middle finger, and from two to four inches in length. The dilating capacity of these tents is about twice their compressed size (200 per cent.).

It is so easy now to procure any size and number of sponge tents at the instrument-makers or druggists, tents which are much neater and smoother than the amateur can make them, unless much trouble be taken, that it is scarcely necessary for a physician, living within easy distance by mail of any city, to know how to make them himself. The brief directions given above, will, however, enable him to do so, should a sudden emergency arise, and no tents be at hand. Dr. Beverly Cole, of San Francisco, has recently shown a very rapid way of making compressed sponge, by simply dipping a suitable piece of sponge in melted wax (which can be had anywhere), placing the hot waxed sponge between two sheets of bibulous paper, laying it on the floor, or a hard chair, with a book over it, and standing or sitting on the book for a few minutes, until the wax has had time to harden. The amount of compression will naturally depend greatly on the weight of the individual. The flat compressed sponge can then be cut with a pocket-knife into any desired shape.

An objection to this thorough impregnation with wax is that it takes rather a higher temperature to melt the wax than the body affords, and that the imbibition and expansion of the sponge is not quite as thorough, perhaps, as when a soluble ingredient is used.

Some gynecologists have given the tents a curved shape, to conform to the direction of the uterine canal, and doubtless it is easier to introduce such a curved tent through a flexed canal. When the tent swells it becomes straight, and thus acts quite as well in straightening the uterus as the straight tents.

Prof. Ellerslie Wallace, of Philadelphia, has inserted a slender watch-spring in the curved tent, giving the spring the opposite curve to that of the sponge, and uses this contrivance to straighten a retro-displaced and slightly adherent uterus. When the sponge swells, the spring begins to act and draws the fundus uteri up, and thus stretches the adhesions. The idea certainly seems very plausible, but I have no experience with the method.

The rapidity with which the sponge swells is so great that no time should be lost in inserting it into the uterus, since a moment's delay after it has touched the moist cervical canal results in a roughening of the surface of the sponge, and difficulty or inability to complete the maneuvre. The sponge has generally reached the limit of expansion within an hour from the time of its introduction, sooner indeed. But it should be left in the uterus for several hours after its expansion in order to produce a permanent effect.

The peculiar formation of a sponge, the multitude of small alveoli scattered through it, greatly favors the admission of air and the decomposition of the secretions absorbed into the sponge from the surrounding tissues. The absorption of these putrid secretions by the neighboring blood-vessels and lymphatics is followed by local inflammation and perhaps general septic infection. To prevent this decomposition, sponge tents are now always impregnated with some disinfectant, usually carbolic acid. Lawson Tait has them soaked in oil of cloves, Aveling in a solution of permanganate of potash. The carbolic is the best. But none of these preventives are certain against infection.

Manner of introduction.—A sponge tent may be introduced either with or without a speculum. It may be seized in the long dressing-forceps, or it is mounted on a stylet slightly curved like a sound, and is carried up to the cervix and its point inserted in the external os. The flexible metal slide applicator of Emmet, shown in Fig. 132, answers very well for this purpose. By means of the forceps or stylet the sponge is firmly pushed into and through the cervical canal, being aided by pressure over the fundus with the outer hand if no speculum was used, or by steadying the cervix with a tenaculum if the operation is done through a speculum.

I have never tried to introduce a sponge tent without a speculum, fearing that the inevitable contact with the vaginal secretions would roughen the surface of the sponge, and interfere with its passage, and finding the operation often quite difficult enough when the os was exposed. Still, when the os is patulous and the canal tolerably wide, I do not doubt the feasibility of introducing a sponge in this manner. The crowding down of the fundus uteri over the sponge is the one point of this method.

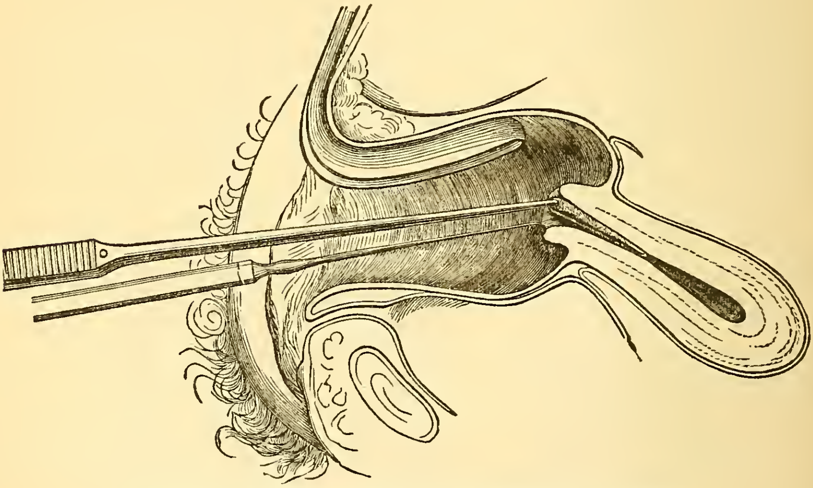

FIG. 165.—Introduction of sponge tents through Sims' speculum. (Sims.)

A large and short cylindrical and a valve speculum may give space enough to insert the tent, if the canal is not flexed and of fair width. I prefer the Sims and perform the maneuvre in the following manner: Having exposed the cervix, I seize the anterior lip with the tenaculum, draw down and straighten the uterus. The tent is then impaled on the stylet (every tent has a small hole in its base for the purpose), and is rapidly dipped in an open bottle of pure carbolic acid as an additional safeguard against decomposition. It is then quickly buried in a pot of vaseline and without a moment's hesitation inserted into the os and pushed forward in the direction of the internal os. No time must be lost in these several steps, else the surface of the tent will become rough from the carbolic acid, and a new tent will have to be substituted. When the tent has been forced up through the internal os and its base projects but slightly from the external os, it is held for a minute or two to give its point the opportunity to swell and thus insure its retention ; the slide is pushed down and the stylet withdrawn. If the forceps are used to carry the tent, care should be taken not to twist the twine attached to the tent into the forceps-blades; else on removing the instrument, the tent may also be accidentally dislodged. The vagina is now cleansed of any secretions (blood or mucus) and several carbolized flat glycerine tampons placed over the cervix to insure retention of the tent and prevent the escape of any discharge. The patient is placed in bed and kept there until after the removal of the tent. The expansion of the tent soon gives pain, and I therefore always leave a prescription for several morphine suppositories of one-fourth to one-half a grain each, to be taken according to the amount of pain, and direct that hot applications be made to the abdomen and a hot bottle kept at the feet.

It is a matter of some importance in choosing the size of tent to be introduced, not to take too large a one, which may need to be crowded into the uterine canal. As a rule the tent will then catch at the internal os and become so rough and swollen during the fruitless attempts to force it in, as to be worthless. The only thing to do in such a case is to throw the old tent away and do what should have been done at first, select a smaller one, which will easily pass through the internal os. I have repeatedly made this mistake, hoping to accomplish a thorough dilatation in one sitting, but have been obliged to desist and content myself with a moderate dilatation, following it up later with some other method. Besides the annoyance of failing in the attempt and giving the patient unnecessary pain, the inevitable lacerations of the cervical mucous membrane through the tearing out of the tenaculum open channels to septic infection. Occasionally the rapid dilatation of the internal os with a steel two-bladed dilator will permit the introduction of the tent.

Care should always be taken not to push the tent in so deeply as to bury its base within the os. If this be done when the tent swells the external os closes over it, and it will be found exceedingly difficult to force the enlarged and rough-surfaced sponge through the narrow orifice when it is seized by the forceps or string with a view to removal.

If a stylet is used to introduce the tent, it might readily occur that considerable force in pushing up the sponge might thrust the point of the stylet through the whole length of the tent and injure the uterus.

No sponge-tent should be allowed to remain longer than twelve hours, and less will usually suffice. It is therefore a good plan to introduce the tent early in the morning and remove it on the same day toward evening. If introduced in the afternoon eighteen or twenty hours may elapse before the physician can again see the patient and remove it, and that might be too long. Except where a very decided alterative and stimulant effect is desired, it is better to remove the tent before the twelve hours are up than to prolong the interval. As already stated, the patient has not left her bed since the insertion of the tent. When the time has arrived to remove it, I again place the patient in Sims' position, expose the cervix with Sims' speculum, remove the tampons, and seizing the sponge firmly with the dressing-forceps give it a slight rotary motion to dislodge it and then draw on it steadily and forcibly. The uterus is thereby forcibly drawn down, and to steady it I place two fingers of my left hand on either lip of the cervix, or encircle the cervix with the loop of the depressor. A very convenient instrument for this purpose has been devised by Sass. Considerable force is often required to remove a sponge tent, in consequence of the intimate relations between the minute surface-particles of the sponge and the inequalities of the mucous membrane. The result is that the membrane is generally considerably torn and excoriated, and it may even be removed almost *in toto*. This property of the sponge dilator has been used as a therapeutic agent in hyperplastic endotrachelitis and enlargement of the Nabothian glands, which are torn off, as by a curette, when the sponge is removed.

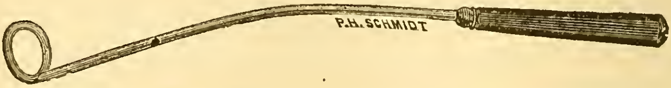

FIG. 166.—Sass' counter-pressure loop for removal of dilating tents.

The withdrawal of the sponge leaves a gaping bleeding cavity, which should be washed out with a carbolized solution or mopped out with an applicator and cotton soaked in carbolized glycerine. The procedure for which the canal was dilated (digital examination of the uterine cavity, intra-uterine application, curetting of the cavity, division of the capsule of a fibroid tumor, removal of a polypus), may then be at once undertaken; or if the sponge was introduced as a therapeutic measure in itself, nothing further is done. The uterine cavity and vagina having been thoroughly cleansed and disinfected, carbolized glycerine tampons are again introduced if a watery drain is desired, and the patient again put to bed where prudence dictates that she should stay for at least another twenty-four hours. The dangerous results of the sponge tent have usually followed within twenty-four hours after its removal; due caution should therefore be exercised by the physician and impressed upon the patient. All exposure to cold and excitement for several days should be carefully avoided, and frequent cleansing injections be employed.

An anesthetic is seldom needed either for the introduction or removal of the tent. But an opiate is usually required during the dilating period. Abdominal pain, of a grinding, expulsive nature, is usually felt, in proportion to the size of the sponge and the elasticity of the tissues, and I have even seen nausea and vomiting (reflex), chills, and slight collapse occur at the height of the distention. Such symptoms need not in themselves alarm the physician; but if the patient should have repeated chills, or the pain resist a fair quantity of opium (best given in suppositories), the immediate removal of the tent is called for, especially as the severity of these symptoms shows that it has done its duty so far, at least, as dilatation is concerned. If it is intended to perform some of the operations above mentioned immediately after removing the tent, it is advisable to anesthetize the patient before proceeding to remove it in order to have no delay afterward.

A sponge tent should *always* be introduced at the house of the patient, *never* in the physician's office. The latter practice, although frequently followed, is always hazardous, and any accidents which chance to ensue should very properly be laid to the fault of the physician. It is little short of criminal carelessness and audacity to trifle in this manner with so dangerous an instrument as the sponge tent.

Quite as important as this rule is that, not to follow one sponge tent immediately by another. It has been stated that in removing the tent more or less uterine mucous membrane is removed with it, and that therefore a raw, abraded surface remains. Now it is a matter of experience that a freshly denuded surface absorbs septic germs much more rapidly than one covered with granulations. And this is the reason why it is always advisable to wait a few days until granulations have formed in the cervix before repeating the tent. If immediate dilatation is still required the finger may be tried, or a steel or sound-dilator, or one of the non-infecting gradual dilators (laminaria and tupelo), yet to be described, should be inserted. For this same reason a sponge tent should *never* be employed immediately after a cutting operation on the cervix or uterine body. I am aware that this rule has often been violated, but its violation has cost a certain number of victims, and the profession are now of one accord in condemning the repeated introduction of sponge tents. Some authors even go so far as to proscribe them entirely. This I think is going a little too far. Deaths from a single sponge tent have been reported by Thomas, Goodell, Olshausen, Hildebrand, Winckel, Aitken, Lusk, Janvrin, and quite a number of others. Only within the past month a physician of this city (a specialist) lost a patient of metro-peritonitis which came on immediately after the removal of a sponge tent. That such accidents can happen to experts proves only that the agent is a dangerous one and that every possible precaution should be taken when circumstances compel its employment. When another agent will do as well, it certainly is far safer not to choose the sponge.

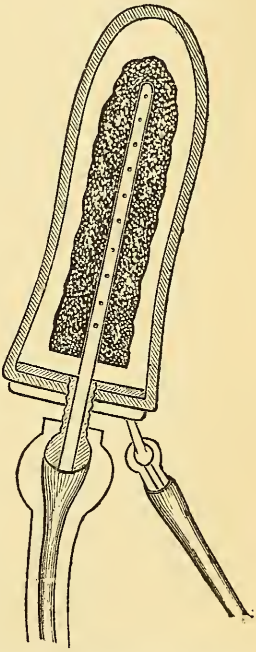
FIG. 167.—Emmet's sponge dilator.

To avoid this danger of septic infection, several ingenious contrivances have been proposed. Thus the tent is enveloped in goldbeater's skin, the base being left uncovered. When introduced the base projects from the os, and the sponge is expanded by water injected into the vagina, and by glycerine and water tampons placed over the cervix. Or the whole tent is covered, fluid being admitted to the tent through minute holes pricked in the skin at the base. Or thin gutta-percha or rubber cloth is used instead of the goldbeater's skin. Emmet has constructed a sponge-dilator shown in Fig. 167. "Through a disk of hard rubber passes a brass tube, which is perforated by a number of small holes, and open at each extremity. This tube is passed through the centre of a sponge tent of suitable size, the whole being covered by a thin india-rubber cot or bag, of which the mouth is stretched over the edges of the disk, and the free edge of the cot, which has been drawn over the disk, is then secured between the under side of the disk and the brass plate. The plate has attached to it, on one side, a knob which can be grasped by a pair of forceps, the blades of which are closed by sliding forward the canula. When the knob is held by the forceps, a ball-and-socket joint is formed, which will admit of motion in any direction. Over the bulb is slipped a piece of india-rubber tubing, a foot or more in length, through which water is introduced for swelling up the tent, and at the end of the tube is a stopcock. To the other side of the stopcock a Davidson syringe may be attached, or, what is better, a thin india-rubber bag, such as are used for pessaries, with tube and stopcock. The dilator is introduced by steadying the cervix with a tenaculum in one hand, and by holding the forceps and tubing in the other hand, the proper direction can be given to the instrument. When it has been introduced within the canal to the proper depth, a small amount of water is to be thrown in before removing the forceps. As the tube in the centre of the sponge is open at its extremity and its sides perforated, the water will make its exit at the upper portion, and dilatation will extend from above downward, so that the instrument cannot slip out. The sponge is sufficiently dilated in a few moments to cause it to be retained, and the forceps may then be removed by sliding back the canula. The patient is told to lie on her back in bed, and to place on her abdomen an air-bag containing water, which is made to flow into the dilator by occasionally compressing the bag with the hands." The dilator is generally retained twelve hours, unless more rapid dilatation is desired. By opening the stopcock the water is drained off from the sponge, and the dilator is then withdrawn by seizing it with forceps by the knob, and pushing back the uterus with the finger of the other hand. The disadvantage of this instrument is that it requires an already moderately dilated canal to allow its introduction.

These contrivances certainly look very useful and plausible; but I do not believe they have become popular as yet, chiefly because we have of late obtained a substitute for the sponge in the tupelo root, to be described presently.

The *counter-indications* to the use of sponge tents are therefore such as are common to all applications to the uterus, viz.: acute, subacute, or recent chronic inflammatory conditions of the uterus or adnexa, and pregnancy; and such as are special to sponge tents, viz.: a fresh wound or raw surface in the endometrium, and a hyperemic, readily absorbent condition of the tissues, as during abortion.

The *dangers* arising from the use of sponge tents in any case have already been referred to, viz.: metro-peritonitis, cellulitis, septic infection, and death. Considering the recklessness with which this agent has been employed for many years, and its universal use by general practitioners and all who dabble in gynecology, it is greatly to be wondered that the accidents and deaths from it have not been more frequent. Surely, a special Providence reigns over the female sex in this as in very many other manipulations to which their reproductive organs are subjected ! Be it understood, then, that it is not the dilating property of the sponge tent which is dangerous, but the decomposition of the fluids it has imbibed, and their absorption through the abraded surface left after the removal of the tent. The peculiar porous character of the sponge favors both this decomposition and the abrasion in a far greater degree than the other absorbent dilators.

The *precautions* to be observed, therefore, in using sponge tents are: 1, *always* to introduce them at the house of the patient, and keep her in bed while the tent is retained, and for at least twenty-four hours after; 2, *never* to insert a second sponge *immediately* after the first, but adopt other means of increasing the dilatation, if it is still needed, or defer the second tent for several days until granulations have formed in the endometrium; 3, *never* to introduce a sponge tent against a freshly wounded surface, as after discission of the external or internal os, or operations in the uterine cavity; 4, never to use a sponge tent when there is evidence of previous inflammation in or about the uterus, or pregnancy exists or is suspected, or an abortion is in progress or has recently taken place; 5, never to leave a sponge tent in the uterus longer than twelve hours; 6, always to disinfect the tent thoroughly immediately before inserting it, and the vagina and uterine cavity after its removal; 7, to use a tent which will readily pass through the internal os at the first attempt; 8, to treat the procedure as an operation, possibly productive of serious consequences.

Laminaria tents.—These tents were introduced into practice by Sir James Simpson, G. J. Wilson, and Carl Braun, about the year 1863, and are made from the root of the laminaria digitata, or sea-tangle, by removing the bark and turning them on a lathe until their surface is entirely smooth and uniform. They come in sizes varying from that of a knitting needle to that of a lead-pencil, laminaria tents of a larger size than the latter being rare because the plant seldom grows thicker. The tents are made about two inches long, rounded at either end, and of uniform thickness throughout, not conical like the sponge tents. They come either solid, or perforated through their length, a modification recommended by Greenhalgh in order to increase their surface of absorption and thereby their expansion. Through one end of the tent is drilled a hole, in which a cord is fastened for the removal of the tent. The best laminaria tents come from England.

The material is exceedingly hard and almost incapable of being cut by a knife. I have broken the blade of my pocketknife in the attempt to whittle down a laminaria tent. A file alone will make an impression. This exceeding density entails a comparatively slow and limited absorption and expansion, as against the sponge tent. While the latter will dilate within a few minutes almost to three times its compressed size, the laminaria will barely double its diameter in the course of several hours. According to experiments made by Cohn, a laminaria tent, fifty-five millimetres long, increased in length by only six millimetres in twenty-four hours, but expanded from twenty-four millimetres to forty-two millimitres. The increase in length is therefore but slight, that in thickness not quite 100 per cent. In an inverse proportion to the density of the laminaria and its slowness of expansion, is the force with which it expands. Matthews Duncan states that his experiments show that the laminaria expands with a force of 500 to 600 pounds to the square inch. The walls of a uterine canal, therefore, which would yield but little to a sponge tent, will be slowly but steadily forced apart by the laminaria. The peculiar imbibition and softening of the tissues produced by the sponge is, however, much more marked with laminaria. The action of the sponge is, therefore, although more rapid, rather less painful and forcible than that of the laminaria. The soft, succulent tissues dilate more easily.

The hollow laminaria tents swell more rapidly and thoroughly than the solid ones, but not as forcibly, because the thin walls are easily compressed by the dense uterine canal. It is therefore questionable whether the perforation of the tent is really an improvement or not. The greater expansion is more or less outweighed by a diminution of resistance and increased compressibility.

The limited size of the laminaria tents, the largest when fully expanded not exceeding the thickness of the little finger, is an objection which can be overcome by inserting several tents side by side, one after the other, or a bunch of small tents held together by a rubber band. This is exceedingly plausible in theory, but by no means so easily carried out, as any one will confirm who has tried to introduce a second tent beside the first, which is constantly slipping out of the cervix as soon as the pressure upon it by forceps or tent-applicator is removed. And to introduce a bunch of tents requires a patulous canal, free from rugæ and pockets, in every one of which the point of one of the tents is liable to catch. However, practice makes perfect, and Atthill constantly applies tents in this manner, and is very well satisfied with it.

The laminaria tent, being constructed from a salt-water plant, contains a large quantity of salt which is distinctly recognizable by the taste. When a laminaria tent is expanded, its smooth cylindrical surface is lost, and it becomes rough, with sharp edges extending along its long diameter, and appears twisted on itself. This is due to the peculiar twisted condition of the fibres of the plant, which is not apparent when the surface is smoothly turned. Curiously, when the rough, unpolished root is swelled in water, its surface becomes round and smooth, because the inequalities in the surface are equalized by the swelling. When it is turned these compensating inequalities are removed, and therefore the surface becomes rough.

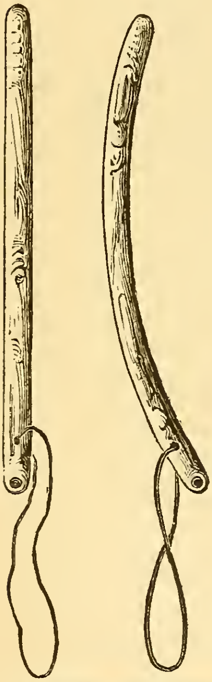

FIG. 168.—Laminaria tents, straight and curved. (P. F.M.)

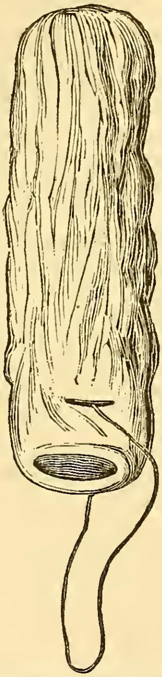

FIG. 169.—Laminaria tent dilated in water. (P. F. M.)

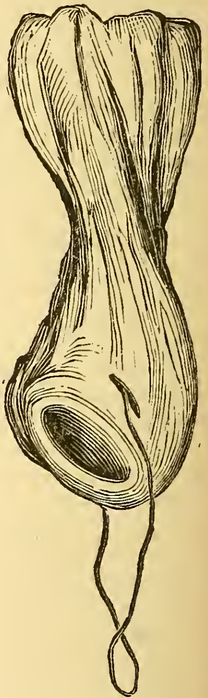

FIG. 170.—Laminaria tent dilated in utero, showing constriction by internal os. (P. F. M.)

A laminaria tent is very liable to expand unequally in the uterine cavity, the portions in the cervical canal and uterine cavity proper, swelling to their utmost limit, and the spot corresponding to the narrow internal os remaining comparatively unexpanded. The tent then assumes the shape of the cervical and uterine cavity, as shown in Fig. 170. Naturally the removal of a tent expanded in this manner is difficult, because the expanded upper part of the tent must be forcibly drawn through the narrow internal os, as shown by the unexpanded isthmus. Besides, if the tent should have been inserted entirely within the external os, which it is often necessary to do to prevent its slipping out before a tampon can be applied to retain it, the external os will close over the tent, and further difficulty be experienced in obtaining a firm grasp and removing it.

By placing a laminaria tent in warm water for a few minutes it becomes slightly softer and can be bent so as to conform to the natural curve of the uterine canal, retaining the shape when hard. This curve often greatly facilitates its introduction.

Manner of introduction.—A laminaria tent may be introduced in very much the same manner as a sponge tent, either on the finger or through a speculum. The speculum is always advisable, because a tampon is at once required over the cervix to retain the tent. If the tent is hollow it may be impaled on a Sims thick slide-applicator, or stout metal applicator, or the sponge tent expeller (see Fig. 131). If solid, it is seized in the forceps and carried into the uterine canal. The outer hand will greatly aid the passage through the internal os. It is, as a rule, much easier to introduce a laminaria than a sponge tent, because its smooth surface and slow absorption, and its uniform size offer no obstacles. But this very smoothness renders the retention of the tent more difficult, and it often requires quite a deal of trouble and ingenuity to retain the tent until a tampon can be placed over the os. By holding it within the external os with the forceps or the left index finger, until the tampon can be seized and placed over the cervix, or a second tent can be grasped and passed beside the first, and then holding both with the index or forceps, and so on, this annoying gliding out of the tents may be avoided. It is not advisable to push the tents up to the fundus and thus insure their retention, because it would probably be very difficult to remove them after expansion, and the uterine cavity would be unnecessarily irritated. It is the uterine canal, up to a short distance above the internal os, which we wish to dilate, not the region of the orifices of the Fallopian tubes.

If there is any obstruction at the internal os, the cervix, which of course has all along been steadied with the tenaculum in the anterior lip, is drawn well down, and the left index finger gently presses the tent upward, in place of the applicator. By gently manipulating the point of the tent, as of a sound, it may often be guided past the obstruction. Of course, the rule of not choosing too large a tent, applies here, as well as to sponge tents, and the tupelo, still to be described.

One tampon will not suffice to fix the tent, unless it chances not to show any tendency to escape. It is generally best to pack the vaginal vault pretty tightly with several tampons.

In order to obtain the utmost expansion of a laminaria tent, it should be left in utero at least eighteen hours. I generally leave them in overnight, keeping the patient in bed, and usually also slightly under morphine until the forenoon of the next day. Expansion does not commence as rapidly as with sponge tents, nor does it reach its limit so soon. The laminaria dilates more slowly, but with unsparing persistency, and the pain is generally more severe, especially in cases of constricted internal os. I have seen decidedly more temporary reaction (reflex nausea, vomiting, and shock) during laminaria dilatation, than with sponge tents. It is therefore quite as important to observe every precaution against inflammation, even though laminaria does not possess the pernicious quality of favoring decomposition of the fluids absorbed by it.

The laminaria is also removed through the speculum, the end projecting from the cervix being seized in stout forceps, and counter-pressure against the cervix being exercised by the finger or instrument already described. By a twisting, half rotary movement, the tent is then loosened from the grasp of the uterus, and removed. The almost invariable greater expansion of its internal end, over the middle portion, renders this act quite difficult, and the dragging of the rough tent through the (in spite of the dilatation) still narrow internal os, gives rise to injury and hemorrhage from that point. This cannot be avoided, and the abrasion is always less than that from a sponge tent. After removal of the tent, the uterus and vagina are cleansed, and the patient returned to her bed under the same precautions as described after sponge tents. I am in the habit, after the removal of any form of tent, of passing a cotton-wrapped applicator saturated with pure carbolic acid or carbolic and glycerine into the uterine cavity, as an additional precaution against infection. It very seldom happens that an expanded laminaria tent becomes so soft through long maceration, as to be torn in pieces during removal. With sponge tents this is by no means an uncommon occurrence.

Prof. B. S. Schultze, of Jena, Germany, has lately described a new method of dilating the uterus with laminaria tents, which is characterized chiefly by exceeding care in disinfecting vagina, tents, and uterine cavity, by carbolic applications during the whole process, and by never allowing a tent to come in contact with a fresh wound. His method is briefly as follows: The direction and calibre of the uterine canal is first ascertained by careful probing with graduated probes of soft metal, bent as nearly as possible to the curve of the canal, as suspected by bimanual examination. If a drop of blood follows the probing, showing an injury to the mucous membrane, the laminaria introduction is deferred twenty-four hours. The cervix is exposed by a duckbill speculum, applied in knee-chest position, the uterus drawn down by a tenaculum, and again probed. If blood follows, another delay of twenty-four hours and then repetition of the steps already stated. The vagina is cleansed by cotton wads soaked in a three per cent. solution of carbolic acid, in which all the instruments (previously soaked in boiling water) are kept. A laminaria tent, corresponding in length and size to the uterine canal, is now dipped for a moment in boiling carbolized water, and then bent to the proper curve, as ascertained by the probe, and hardened in cold water, also carbolized. With forceps the tent is now gently inserted into the uterine canal, carefully following its curve. If any bleeding occurs, the operation is deferred twenty-four hours. If the tent meets with an obstacle which is not easily overcome, fresh probing. When the tent is *in situ*, a tampon of salicylated cotton, soaked in carbolic solution, is placed over the cervix, then several glycerine tampons; tenaculum, and speculum are removed, and the patient placed on her side, and put to bed, where she remains in perfect quiet for several hours. Abdominal pain is relieved by hot-water applications. In from six to eight hours the tent has fully expanded, but it may be left in utero for twelve to sixteen hours. It is removed precisely in the same position as it was introduced, the tent being very carefully withdrawn to prevent injury. The canal is then measured again with thicker, flexible probes, and if it has reached a width of 7 millimetres above the os internum, which is generally the case with an original calibre of 4—5 mm. after one dilatation, the introduction of a flexible metal catheter of a diameter of 6 mm. is feasible, through which the uterine cavity is irrigated with one-fourth to one-half pint of a two to three per cent. carbolized solution at about 100° F. Any fluid medicinal application may now also be made. The catheter should also have the curve of the uterine canal. The propelling power of the water is the ordinary fountain irrigator. If further dilatation is desired, a second larger laminaria tent is inserted after the irrigation, which is retained and removed in the same manner, and may be followed by a third and fourth if necessary, or by two at a time. In normally located or anteverted or anteflexed uteri, the knee-breast position is the best; for utero-displacements, the gluteo-dorsal. In thirty-six hours a virgin uterus can be opened up to the fundus to the exploring finger.

Schultze reports having applied the laminaria in this manner over a thousand times, and that he observed pelvic cellulitis in but five cases after this procedure, and the diagnostic and therapeutic measures which were required. In hyperplasia and subinvolution of the uterus, repeated forcible dilatation with a diverging steel dilator proved very beneficial in promoting absorption and involution.

Tupelo tents.—The disadvantages inherent to the two agents for gradual dilatation just described—of sponge tents, the danger; of laminaria, the small size and unequal expansion—these disadvantages led the profession to seek for a substance, which, while it would not favor decomposition of fluids, would absorb them rapidly and thoroughly, and could be procured in sizes sufficient for more thorough dilatation than the laminaria. Such an agent should possess the range of size, the rapid and equable expansion, and the softness of texture of the sponge tent, and the comparative safety of the laminaria. This substance has been found within the past three years by Dr. G. E. Sussdorff, formerly of Macon, Ga., now of New York, in the root of the nyssa aquatica, or tupelo-tree of the Southern States. This root comes in sizes as thick as a man's wrist. It is so soft as to be easily cut to any shape or size desired with the penknife; it is capable of a great degree of compression; it absorbs fluids rapidly, and expands to at least double its compressed size; when expanded its surface is, although not perfectly smooth, not sufficiently rough to injure the mucous membrane during its removal; it does not favor decomposition of fluids, indeed, I have never found a tupelo tent to possess the slightest offensive odor after having been left in utero over twelve hours. The rapidity of expansion of the tupelo almost equals that of the sponge tent; therefore, it can be used when the dilatation and the diagnostic or therapeutic purpose for which it was made admit of as little delay as possible. Tupelo tents are now made of all sizes, from a knitting-needle to a thumb, and of any desired length. They can be procured larger, but so far no use has been found for larger sizes. The usual length is like that of laminaria, two inches. They are prepared by subjecting the root to excessive pressure in a machine by dry heat. The surface is smooth, although not polished, and they are therefore far less likely to slip out of the cervix than the laminaria. Besides, after having been used once, they can be cleaned, disinfected, compressed, and again used as though they were new. This can scarcely be done with sponge or laminaria tents, at least the trouble is greater than the gain.

An additional advantage which the tupelo tent has over the laminaria, besides its size, and in which it resembles the sponge, is that it softens the tissues and renders them more succulent and dilatable. The dilatation of tupelo, when very thoroughly compressed, is at least 100 per cent., and usually very uniform, the ring of constriction indicating the internal os being much less marked than in laminaria. The sponge tent also shows this constriction in marked cases. The degree of expansion of a set of five tupelo tents is illustrated by the following diagram, the dotted outline of each tent showing its expansion.

The large size and safety of the tupelo tents renders them available in cases where the danger of septic infection has led us to dread sponge tents and to substitute soft rubber dilators with but imperfect success, viz., constricted cervical canal in abortion, and premature labor, cases in which the small size of the laminaria tents render them useless. I have repeatedly employed the large tupelo tents in abortion to hasten the expulsion of the ovum, or permit the manual removal of the placenta with great satisfaction. In a couple of hours the tent had dilated the cervix sufficiently for my purpose. In stenosis of the vagina, where septic infection is also to be feared, the large tupelo tents expand the canal to the desired size, so also in stricture of the rectum.

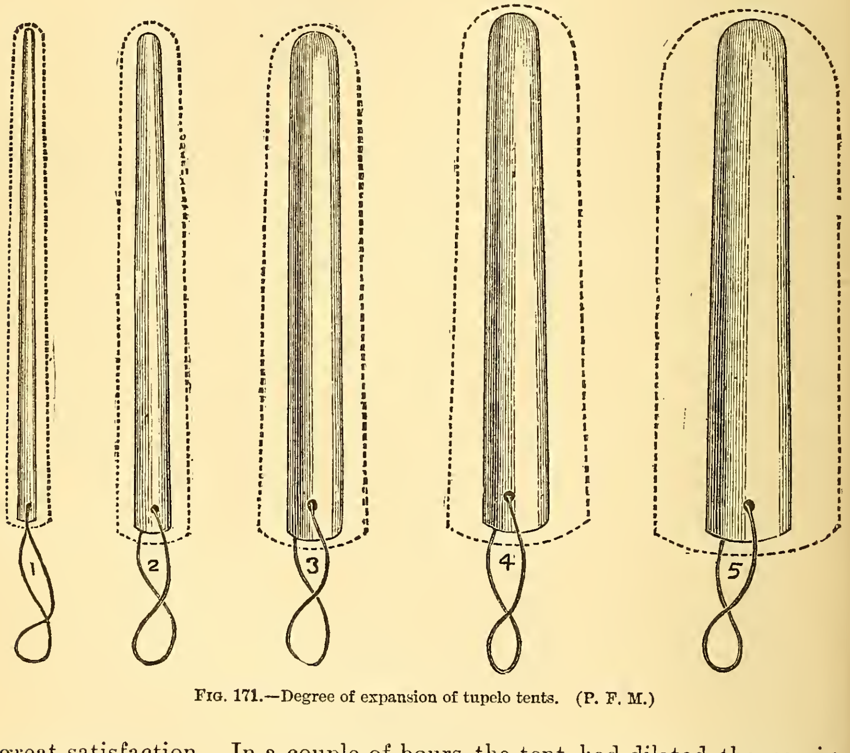

Fig. 171.—Degree of expansion of tupelo tents. (P. F. M.)

In fact, wherever thorough, rapid, and safe dilatation by gradual methods is desired, the tupelo tent is the agent to be chosen. In only one particular has it as yet failed to supplant the sponge tent, viz.: in the irritating, stimulating, and softening effect which the latter has on the surrounding tissues, a property of great value in subinvolution, hyperplasia, and atrophy of the uterus.

The *method of introducing* the tupelo tent is precisely identical with that of the laminaria, except that the tent being solid, must be seized with the forceps instead of being impaled on an applicator. It is dipped in vaseline and introduced, the same precaution having been taken not to choose too large a tent. A tampon is also best placed over the cervix. Accordingly as a rapid conclusion is desired, or a more thorough dilating effect intended, the tent may be removed in two or three hours, or left in for twelve to eighteen hours. Longer than the latter period would scarcely ever be necessary or useful. It is wise to use the same precautions after tupelo as after other tents.

One of the great comforts of the tupelo tent is, that if it has been found impossible to force the tent chosen for the case through the cervical canal, it need not be thrown away like the sponge tent (which has become expanded and rough) or laid aside for another smaller size, like the laminaria (which smaller size may not be at hand, and cannot be at once prepared, as the laminaria is too hard for whittling)—but can be whittled down in a moment with a penknife to the required size.

Another advantage is that the tupelo can be introduced immediately after a fresh incision has been made (as after dividing the internal os), because it does not favor septic absorption. And as many tupelo tents can be inserted, one after the other, as may be desired, for the same reason. This property, to be sure, belongs to the laminaria also.

The expense of the tupelo-tent is about equal to that of the laminaria. With the increasing popularity of the tupelo (it is as yet scarcely sufficiently known) this disadvantage will doubtless disappear.

Tents and bougies made from the bark of the *slippery-elm tree* have been used by some gynecologists. Dr. Byford, of Chicago, highly recommends these tents for their mildly dilating and safe qualities in flexions of the uterus, and bougies of the root in different sizes have recently been introduced to the profession by Dr. Skene of Brooklyn, for use in constriction and tortuosity of the uterine canal. The glutinous property of the slippery elm renders these tents almost innocuous, while their repeated introduction gradually relaxes the uterine fibre, and produces moderate dilatation.

Tents made of the *compressed pith of the corn-stalk* have been recommended by Dr. Goldsmith, of Georgia, and I am told by gentlemen who have had occasion to use them, form an efficient substitute for the more powerfully dilating tents, when the latter do not happen to be at hand. The same may be said of the tents of compressed elder-pith.

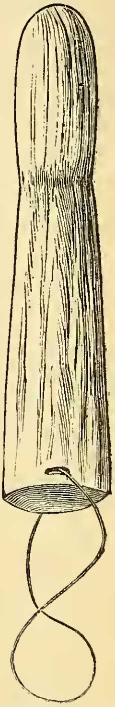

FIG. 172.—Tupelo tent No. 3, after eighteen hours' dilatation in utero, showing slight constriction produced by internal os. (P. F. M.)

The use of tents made from the *root of the gentian* plant (I believe first introduced by Winckel, of Dresden) has not become popular. If it is desired to impregnate the tent with some medicinal agent, according to Chrobak, the slow and mild dilating property of the gentian renders these tents especially available.

Indications for Dilatation of the Uterus.

The indications for dilating the uterine canal by one or more of the foregoing methods, consist either in conditions which interfere with the exit of fluids or solid bodies from, or the entrance of fluids or instruments into the uterine cavity; or in affections which require the dilatation as a therapeutic measure in itself.

Conditions of the first variety—*Interference with the exit of fluids or solid bodies from the uterine cavity*—are: Constriction of the uterine canal (stenosis, flexion, rigidity). The fluids which are thus prevented from escaping are comprised in one, the menstrual blood. The solids which are retained against their will, are fibroid tumors, the immature or full-grown fetus, the placenta.

Conditions of the second variety—*Interference with the entrance of fluids or instruments into the uterine cavity*—are also : Constriction of the uterine canal, from the same causes. The fluid which is prevented from entering is the seminal fluid; the instruments, are the sound, applicators, curette, forceps, syringe, endoscope, the finger.

The diseases, therefore, in which dilatation may be required, are: organic constriction of the uterine canal, flexion (chiefly anteflexion), dysmenorrhea, sterility, all conditions of the endometrium which require the free application of medicinal agents to that part (endotrachelitis, hemorrhage, endometritis, vegetations, malignant disease, hyperplasia, subinvolution).

The conditions in which dilatation is required as a therapeutic measure in itself, are areolar hyperplasia and subinvolution; again, atrophy of the uterus; neuralgic or spasmodic dysmenorrhea, not dependent on organic constriction; endotrachelitis, with cystic hyperplasia.

Special indications for each method of dilatation.—To a certain extent the purposes for which each of the foregoing methods of dilatation is specially indicated have been pointed out in the description of the method. As a general rule, where repeated *rapid dilatation* of an entirely *undilated uterine canal* is desired, the graduated sounds and steel divergent dilators are preferable.

Where *rapid dilatation* of an already *somewhat dilated* canal is intended, the inflatable rubber tubes of Molesworth are the best instruments. The dilatation in such cases probably does not need frequent repetition.

In *gradual dilatation* of an *undilated canal*, tupelo, laminaria, sponge. Frequent repetition is also unusual.

In *gradual dilatation* of a *somewhat dilated* canal, tupelo (larger sizes), sponge, Emmet's water dilator. Also not likely to be frequently repeated in the same case.

Further, where *moderate dilatation* is desired, sounds, divergent dilators, small tupelo, laminaria and sponge tents.

For *thorough dilatation*, large tupelo and sponge tents, Molesworth's and Emmet's water dilators.

Rapid repeated dilatation of an entirely undilated uterine canal is generally indicated in *dysmenorrhea and sterility*. Either the graduated sounds or the divergent dilators may be used, in the manner fully described under each head. I most decidedly prefer the divergent dilators, and have seen excellent results from their frequent and careful employment.

In dysmenorrhea from constriction of the canal or flexion, a few sittings, say two a week for a couple of months, one dilatation being practised immediately before the expected period, will generally result in decided improvement or cure. Whether this is due to the removal of a mechanical obstruction (Emmet does not believe in "obstructive dysmenorrhea") or to the distention of spasmodically contracted muscular fibres at the internal os (practically a mechanical obstacle), a spasmodic stricture—I will not attempt to decide. That the dilatation does good in these cases I have frequently seen. They are usually cases of young unmarried women, or of nulliparæ, in whom more or less anteflexion is found to be the only pathological feature about the uterus, which readily admits the sound. The straightening of the canal by the sound sometimes relieves the menstrual pain, but this result is much more certain after thorough dilatation. I have even seen one dilatation relieve a dysmenorrhea of eleven years' standing in a case of sterility depending on a sharp anteflexion. The treatment may need to be repeated once or twice during several intermenstrual periods, before achieving permanent relief.

In sterility, the treatment requires to be much more persistent and thorough than in dysmenorrhea. My practice in those cases in which the sterility, evidently, or so far as examination shows, depends on torsion or constriction of the uterine canal, or on a conical cervix, or on an excessive rugosity of the endotrachelian mucous membrane, has been, first, to dilate the canal thoroughly, perhaps even incise the external os, as described under Applications to the Cervix; and then to maintain the patency of the canal by the weekly passage of a medium-sized dilator for a couple of months. As soon as the canal appears permanently open, I tell the patient to report after every menstrual period or its date, if it fails to appear. In the latter case, the chance is that the treatment has proved successful. If, however, impregnation has not yet taken place, as shown by the return of menstruation, I proceed to dilate the canal again moderately, tell the patient to use a cleansing borax or phosphate of soda injection every evening (to neutralize any excessive acidity of the vaginal secretion, which is injurious to the spermatozoa), and practise coition that night and every night for a week subsequently. By repeating this process month after month, a successful result was ultimately obtained in a certain number of cases, although I must confess that the number of cases in which impregnation finally took place was but small in proportion to the whole number of cases of sterility. Still, this may have been partly due to the want of perseverance of many of the patients, and to causes not removable by dilatation. In one case the patient, who had been married eight years without becoming pregnant, the sterility doubtless being due to a long conical cervix and narrow external os, did not conceive until five months after the treatment by dilatation (laminaria twice and subsequent divergent dilators several times) had been entirely suspended.

This rapid dilatation may also be practised when an application is to be made to the endometrium. The divergent dilator is the best instrument for this purpose also.

Drs. Ball, of Brooklyn, Goodell and Elwood Wilson, of Philadelphia, Hanks and Watts, of New York, have reported exceedingly satisfactory results in dysmenorrhea and sterility depending on constriction of the uterine canal and flexions, chiefly those of a congenital character, by forcibly dilating the uterus under ether with sounds or divergent dilators to the utmost limit, keeping up the dilatation for fifteen to thirty minutes or longer, and repeating it, if necessary, every month or oftener. The patient, of course, is kept in bed and treated as she would be after any operation on the genital organs, which indeed this manœuvre is. Dr. Ball even introduces a large hard-rubber plug into the dilated uterus immediately after removing the dilator, and has this plug worn for a week or more, during which time the patient is kept in bed. All these gentlemen unite in praising the slight reaction following this treatment. Still, one case of death from peritonitis due to it is reported by Dr. Watts. It certainly looks and sounds very plausible, although some prominent gynecologists pronounce this forcible hyper-dilatation of the uterus a barbarous practice. It seems to me particularly applicable and justifiable in slender, anteflexed uteri with long, conical cervix, when no counter-indication exists and the patient is unwilling or financially unable to submit to the systematic protracted course of gradual dilatation described by Schultze, or the frequent moderate rapid dilatation with divergent instruments. The latter method certainly is too mild and incomplete in very many of the cases in which the peculiar shape and direction of the uterine canal and the dense character of the uterine tissue requires thorough dilatation.

Rapid dilatation of an already somewhat dilated canal may be called for when a fibroid polypus, or a placenta after abortion is to be rapidly removed because the decomposition of the foreign body has begun. Or, violent uterine hemorrhage may require the immediate thorough dilatation of the canal for the removal of the cause (placenta or vegetations by curette) and the application of styptics or the uterine tampon; or a sloughing uterine tumor (fibroid or malignant) calls for thorough disinfectant irrigation of the cavity. These indications are fulfilled exceedingly well by the tubes of Molesworth's instrument, size after size of which may be used at one sitting until the expansion is sufficient. The dilatation is greatly facilitated by the softness and serous imbibition of the tissues generally to be found in such cases.

Gradual dilatation of an undilated canal is practised in similar conditions as the rapid dilatation, but the difference is that the effect obtained from the gradual method is more permanent and thorough than from the rapid. In dysmenorrhea, and chiefly in sterility, if the repeated rapid method fails, the canal may be thoroughly dilated by tupelo, laminaria, or sponge tents, either once, or at intervals of one or more months, in order to insure a permanent effect. In the intervals the canal may be kept pervious by mild rapid dilatation. Gradual dilatation may further be practised as a preparatory step to intra-uterine medication; to the introduction of a stem pessary, or the removal of intra-uterine growths.

Gradual dilatation of a somewhat dilated canal may be indicated in the same cases where rapid dilatation by Molesworth's instrument has been recommended, when there is no haste, and a gradual expansion seems safer. Thus we may use the large tupelo tents in rigidity of the external os and cervical canal in abortion or labor, in constricted vagina, in stricture of the rectum. The sponge tent, which would dilate quite as well, is decidedly counter-indicated in cases of labor or abortion, where its septic properties are rendered specially dangerous through the great vascularity of the parts during pregnancy.

In a uterus partly dilated by a polypus which is gradually forcing its way down, or by the softening process accompanying long-continued bloody, serous, or purulent discharge, the larger varieties of tents are also useful to complete the dilatation.

All dilating agents which act by absorption of fluids (all the tents, therefore), and the dilated rubber tubes, can be used as uterine tampons.

when a sudden arrest of hemorrhage is desired. They may be left in the uterus for varying periods, from several hours to twenty-four hours, according to rules already given and the necessity of the case.

Sponge tents possess *special indications*, through their peculiar property of causing serous imbibition and relaxation of the surrounding tissues, and the stimulant, alterative effect which their presence exerts on torpid and enlarged uteri. They are therefore most beneficial in hyperplasia, subinvolution and atrophy of the uterus. Another special effect of sponge tents is the cure of endotrachelitis by the (really involuntary) removal of the hyperplastic glands when the sponge is withdrawn. The fine meshes of the sponge become interlaced with the follicles, which are forcibly torn away when it is removed. The effect of local applications is of course greatly enhanced by this abrasion of the cervical mucosa.

A peculiar use for sponge tents has been described by Spiegelberg, viz.: to diagnose between beginning scirrhus cancer of the cervix and areolar hyperplasia of that part. Both affections are characterized by great density and hardness of tissue, and to tell which is the cancer, Spiegelberg recommends introducing a sponge tent; if the tent fails to soften the cervix and to dilate the canal in the usual manner, he says the case is one of scirrhus. I have no experience with this test, but should certainly recommend it in view of the difficulty of diagnosing cancer of the cervix in its early stage.

A similar stimulant and alterative effect in chronic uterine enlargements, and also in old indurated pelvic peritonitis and cellulitis, is claimed by Schultze for the laminaria employed after his peculiar method. Only when precautions such as those recommended by him are scrupulously observed would the dilatation of the uterus by any means be justifiable in chronic inflammatory conditions of the parametrium.

The *special advantages of each of these dilating agents* have been discussed during the description. I will merely add a brief synopsis of the conditions in which each article is preferable or pre-eminently useful:

Graduated sounds and steel diverging dilators.—In dysmenorrhea and sterility depending on a constricted, flexed, rugous, uterine canal, where only moderate, temporary dilatation is desired, or where the dilatation is to be frequently repeated. For intra-uterine applications. In all cases where previous preparation is not desired.

Dilatable rubber tubes.—In already moderately dilated uterine canals, with soft dilatable walls (uterine discharges, fibroid tumors, abortion, rigid os during labor).

Sponge tents.—Where stimulation, changes of nutrition, serous discharges, abrasion of the endotrachelium are desired (areolar hyperplasia, subinvolution, atrophy of the uterus, endotrachelitis). For differential diagnosis between cancer and hyperplasia of cervix.

Laminaria.—Where the canal is very narrow or tortuous, or its walls very rigid (flexions, sterility, dysmenorrhea), as an aid to rapid dilatation by sounds, etc., only for occasional use.

Tupelo.—Also where the canal is narrow, or tortuous; further, where thorough, repeated or rapid dilatation is desired; after incision of cervical canal. Where thorough dilatation is intended, and septic infection is specially to be guarded against. Therefore, as a substitute for sponge tents. In fact, whenever easy, thorough, and safe dilatation is desired. The best absorbent dilator.

Counter-indications and Dangers.

So much has already been said on this subject in the body of this section that it will be necessary to say but a few words here.

The usual counter-indications to all operative interference with the uterus, or to the passage of any instrument into the uterine cavity—

present or recent inflammation of the uterus or adnexa—applies even more to uterine dilatation than to any procedure previously discussed. Most to be avoided and guarded is the sponge tent; least the tupelo.

The *dangers* are precisely the lighting up of those inflammatory affections which counter-indicate dilatation; besides, septic infection from sponge tents. I have already spoken of the frequent deaths and accidents from sponges. Those from laminaria are much less frequent, still cellulitis occurs far too frequently to be overlooked. I have been so fortunate as never to have had a worse accident, after any form of dilatation, than a subacute ovaritis, but this I have repeatedly seen from laminaria and dilatation with Ellinger's instrument. From sponge tents, Molesworth, and tupelo, I have had no bad results. My good fortune in this respect has been nothing but luck, for in spite of all precautions serious accidents have happened to the most experienced operators. The extreme caution to be always observed with all these manipulations has already been sufficiently dwelt upon.

Although the tupelo is acknowledged to be the safest and most reliable tent, even it may produce pelvic peritonitis, two cases of which were recently reported by Dr. C. C. Lee, of New York. Not the material, but the act of dilatation may therefore be the cause of the inflammatory reaction.

Dilatation with Cutting Instruments (*Bloody Dilatation*).

The operation consists in dividing the cervix longitudinally either on one side or both, through the anterior or through the posterior lip; or quadrilaterally, crucially. The whole cervix may be divided, from orifice to orifice, or only the external or the internal os. The incisions may be deep, extending almost to the vaginal mucous membrane or the peritoneum (the bilateral division of Simpson, and the antero-posterior section of Sims) or they may be superficial, extending only through the cervical mucous membrane (the superficial trachelotomy of Peaslee).

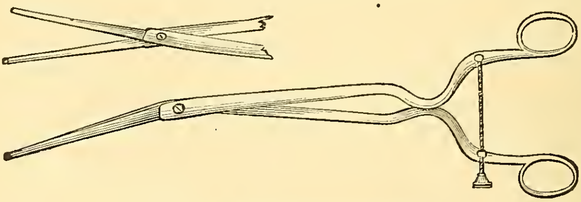

FIG. 173.—Stohlmann's metrotome.

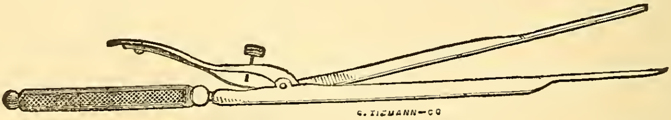

FIG. 174.—Simpson's one-bladed metrotome.

The instruments employed in incising the cervix are either scissors, knives, or two-bladed instruments separated by a mechanism in the handle.

For division of the external os, simple long, straight scissors answer very well, or Kuechenmeister's scissors (Fig. 179); or a long-handled straight or curved bistoury may be passed into the cervix and cut out to any desired depth.

For incision of the remainder of the cervical canal, and chiefly the internal os, a long, straight, slender probe-pointed bistoury is sufficient in many cases; or a movable knife, which can be fixed in a handle at any required angle, may be preferable when a flexion is present. The disadvantage of these one-edged knives is that they need to be turned before the incision in the opposite wall can be made, and that the depth of the incision depends entirely upon the accuracy and steadiness of the operating hand. To avoid this uncertainty, a number of complicated instruments with two blades, cutting in both directions at once, have been devised, all modelled after the original instrument of Simpson. They are called hysterotomes, or metrotomes, and are all introduced closed, opened when the point has passed the internal os and withdrawn open, the knives having been set by the screw at the handle, so as to open only a certain distance. This distance depends upon the amount of division desired, and upon the thickness of the uterine wall. A correct estimate of the depth of the incision, so as to achieve the result wished for, and not to perforate the uterine envelope, constitutes the difficult point in the operation.

An objection to these mechanically acting knives is that the elasticity of the uterine tissue is very liable to deceive the operator into the belief that he has really cut to the depth indicated by the expansion of the blades, whereas the incision was but a superficial one. On the other hand, a knowledge of this possibility may lead the operator to separate the blades too widely, and then by chance too deep an incision may be made. In spite of the convenience of these hysterotomes, the most useful of which are those of Greenhalgh and Stohlmann, the objections named, their expense, and the difficulty in keeping them clean, have led many gynecologists to return to the knife with movable blades. I have often used the long blunt-pointed bistoury shown in Fig. 175, turning the blade to the other side to complete the division, and usually cutting quadrilaterally, until the knife-blade could be easily passed through the internal os. The probe-pointed adjustable knife of Studley has also proved useful in my hands. Peaslee's metrotome is designed to divide only the mucous membrane of the cervical canal, the width of the incision not exceeding one-fourth of an inch.

The *indications* for discission of the uterine canal (from *discindo*, to cut apart, to sever) are: 1, to open the canal instantaneously for the introduction of instruments or the removal of tumors; 2, constriction and tortuosity of the canal, and the intention to achieve a more permanent patency of the passage than ordinarily results from bloodless dilatation.

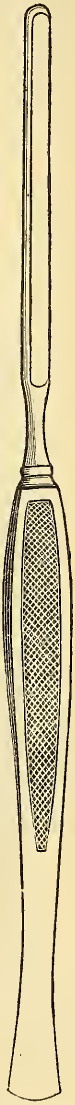

FIG. 175.
Straight, long-handled, probe-pointed knife.

Of the first indication little more need be said than that it is confined almost entirely to operations in which the internal os is already more or less dilated by pressure from above (fibroids seeking to escape) and only the lower portion of the cervix and external os require division to allow the foreign body to be extruded. When the cervical canal is split open, the écraseur, knife, scissors, serrated spoon, or vulsellum can readily be introduced and the tumor removed. For the mere application of a medicinal agent no rational operator would think of mutilating the cervix by deep division.

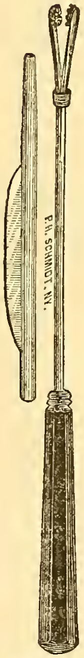

Fig. 176.—Studley's probe-pointed adjustable knife for division of the internal os.

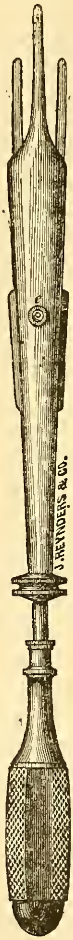

Fig. 177.—Greenhalgh's metrotome.

The second class of indications brings us again to the familiar subject of dysmenorrhea and sterility, which we have handled so fully in the section on Bloodless Dilatation. In many cases the latter fails, for the uterine canal has a persistent and perverse tendency to contract again, unless constantly watched, no matter how thorough the dilatation may have been. Therefore, where it is desired to have a thorough, rapid, and permanent effect, the cervix may be divided through its whole length by one of the knives above represented. If the divided canal is kept properly patent, the result of this discission will certainly be much more gratifying than that of mere dilatation. But not only is frequent dilatation necessary for a considerable period, but also is the operation liable to be followed by serious consequences in the way of inflammation or hemorrhage. It should not, therefore, be lightly undertaken, and as regards dysmenorrhea, I certainly am of opinion that only such cases should be treated by discission in which repeated dilatation with divergent dilators, tupelo or laminaria tents has proved unavailing. I can scarcely imagine such a case.

As regards sterility, however, it is unquestionable that a fully pervious or patent uterine canal is more favorable for conception than a narrow, tortuous passage. This is proved by the readiness with which women in whom the way has once been opened by the birth of a child, conceive again. In view, therefore, of the great tendency of the uterine canal to contract again after bloodless dilatation and the merely temporary effects of that method, the discission of the canal is certainly indicated and justified in cases of sterility in which no other cause but the narrowness or tortuosity of the canal can be detected, and in which repeated bloodless dilatation has failed. Cases of rigid, almost cartilaginous cervix, and conical pointed cervices with small "pinhole" external os, are, in my opinion, those most requiring and benefited by discission.

Besides actual constriction of the cervical canal due to congenital or acquired stenosis, a relative constriction is produced by flexion of the uterus, either at the internal os or of the cervix. Thus the body of the uterus may be flexed forward, or the cervix upward. Either of these deformities (see Figs. 18 and 21) is a frequent cause of sterility, particularly the latter, and in either the canal needs to be dilated and straightened in order to enable the spermatozoa to have free access to the uterine cavity. The bloodless methods very generally fail in these two malformations; chiefly the anteflexed cervix and a division of the posterior lip of the cervix and formation of a larger and straighter cervical canal is called for.

The division of the external os only is indicated in constriction of that orifice for sterility and the retention of the normal or pathological discharge in the cervical cavity.

In retroflexion it is very rarely indicated to divide either the external or the internal os, because, as a rule, this displacement occurs in parous women whose cervical canals have generally been rendered sufficiently patulous by previous parturition. Besides, we have in the appropriate vaginal pessary a contrivance which lifts up the displaced fundus uteri and straightens the canal. The necessity for discission in anteversion or retroversion does not appear to me (unless the canal be actually constricted) because the displacement of the cervix backward or forward and the consequent inaccessibility of the external os to the spermatozoa is easily rectified by replacing the uterus and retaining it by one of the numerous and efficient intravaginal supporters. The hypertrophy of the uterine mucous lining by the chronic congestion, so commonly present in these versions, is much more rationally cured by dilatation with one of the swelling dilators (sponge tent, laminaria, tupelo), or by the curette, or intrauterine medication, than by division with the knife.

In latero versions and flexions, the lip of the cervix corresponding to the fundus may be divided in order to form a straight canal, sterility being the chief (often only) symptom of these displacements. If they are congenital, as is often the case, the operation is indicated; if acquired, *i.e.*, the result of parametritic contraction of the respective broad ligament, it would be unwise to incise, and a proper pessary would be the only (and slight) resource left.

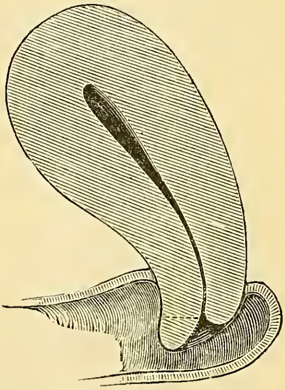

FIG. 178.—Elongation of anterior lip of cervix. (P. F. M.)

If the anterior lip of the cervix projects beyond the posterior with the uterus in its normal position of slight anteversion, or in real anteversion, this anterior lip may be divided by one clip of the scissors so as to make a gaping orifice, and remove the obstacle which otherwise this overlapping lip would constitute to the entrance of the spermatozoa. If the lips of the external os have a peculiar valvular shape, as shown in Fig. 196, the obstructing flap or valve may be excised, as shown by the dotted lines in the cut. A straight, slender bistoury is passed about one-fourth to one-half inch into the cervical canal, and a wedge cut out, as indicated.

Another indication for the division of the cervical canal is the hemorrhage caused by sessile uterine fibroids. Baker Brown first practised this method, and its action has been ascribed by him to the division of the circular fibres at the internal os and the consequent contraction of the uterine fibres about the tumor, and by Spiegelberg to the relief of tension of the uterine mucosa and the shrivelling of its blood-vessels. The method is now but little used, having been supplanted by the, both for hemostatic purposes and ultimate recovery, more efficient division of the capsule of the tumor.

Varieties of Division of the Cervix; their Technique and Special Indications.

Superficial Division of the External Os.—In endotrachelitis, with a narrow external os and dilated cervical cavity, the retention of the acrid, purulent discharge maintains the catarrh and inevitably entails sterility. It is therefore indicated to enlarge the external os by dilatation or incision, the latter being decidedly more effectual and permanent. It can be performed with an ordinary bistoury, or better with a long, straight-bladed scissors (such as Kuechenmeister's, Fig. 179; the knob at the tip of one blade is used to fix that blade at a certain point on the cervical surface and prevent its slipping, and to avoid cutting into the vaginal pouch) or better still with a metrotome, the blades of which cut on either side on being withdrawn.

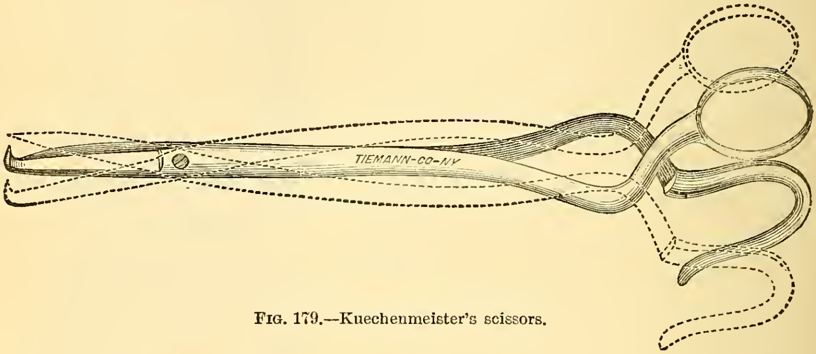

Fig. 179.—Kuechenmeister's scissors.

There need be no fear of profuse hemorrhage from these incisions, unless they are made unnecessarily deep. A quarter of an inch in each direction will generally suffice to make an orifice quite large enough for all therapeutical and practical purposes. The advantage of making a crucial incision is, that the os remains open and its lips do not touch, as is generally the case when only a bilateral incision has been made. The appearance of the os after crucial incision and immediate dilatation with a steel dilator is shown in the accompanying cut. As soon as the circular fibres of the external os are divided the cervix retracts and becomes slightly shorter and broader. This is a valuable result in sterility from conical cervix. When the crucial incision has been made, I always introduce a steel two-branched dilator or uterine dressing-forceps, and dilate the orifice thoroughly, rupturing the circular fibres of the cervix and temporarily paralyzing them (as in hyper-distention of the sphincter ani). Having then swabbed out the blood and obtained a view of the endotra-

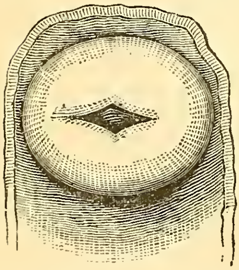

Fig. 180.—External os enlarged by crucial incision. (P. F. M.)

chelian mucous membrane, I apply whatever agent (iodine, nitrate of silver, carbolic or nitric acid, curette) appears indicated, and introduce a plug of cotton smeared with vaseline for the purpose both of guarding against any possible secondary hemorrhage, and of keeping the orifice open. This plug is introduced on a Sims slide-applicator (see Fig. 144) up to the internal os, and then left in the cervical canal by pushing it from the applicator by the metal slide shown in the figure. In doing this it is generally well to steady the cervix by a tenaculum hooked into the anterior lip. On removing the tenaculum care should be taken not to hook out the plug with it. The size of the plug should of course be proportionate to the width of the canal, and it should project but very little from the os, or it is liable to slip out or be wiped out by contact with the vaginal wall. This, however, may be avoided by placing a disk tampon over the cervix. The plug and the tampon both have strings attached to permit their removal by the patient after from twenty-four to thirty-six hours. If the cervix appears particularly vascular, it is well to tampon the vagina more thoroughly and remove the tampons next day, introducing a new supply. The cervical plug should be left in a day or two longer.

This plugging of the cervical canal may be repeated every other day for a week or two until the canal appears to retain the desired width and any cicatricial contraction following the incisions has been prevented. The plugs may be soaked in any agent chosen for the case—iodine, carbolic acid and glycerine, or impure carbolic acid, being the best agents for this purpose, and the cure of the catarrh is thus effected together with the dilatation of the orifice.

These incisions of the external os are not dangerous, and accidents such as hemorrhage, inflammation or septic infection, very rarely follow them. I am therefore in the habit of performing them at my office or the outdoor clinic. Still, as with all active measures, to the uterus, no matter how trifling, it should be borne in mind that an accident may occur when least expected. No reasonable precaution should therefore be neglected.

Free Division of the Intra-vaginal Portion of the Cervix.

This operation consists in incising the portion of the cervix which projects into the vagina up to the vaginal insertion, cutting entirely through the part from the cervical cavity to and through the vaginal mucous membrane covering it. This division may be either bilateral, quadrilateral (crucial), or radiating (five or six incisions, according to Kehrer's method). If more than four incisions are made, the additional cuts will not be carried entirely through the part.

The special indications of this operation are to open the narrow, rigid external os and the lower portion of the cervix for the introduction of the finger, or instruments, or the removal of tumors. In these cases it is generally not necessary to incise the internal os also, because that canal is usually dilated if there be a tumor in the uterine cavity, and if a digital examination or intra-uterine application is merely intended the orifice can be forcibly expanded by the finger or dilators in a few moments. While the circular fibres at the internal os constitute the most constricted and least yielding portion of the uterine canal, they are nevertheless readily dilated by steady pressure from below if the patency of the lower portion of the cervical canal permits that pressure to be made directly against the contracted spot. In case of need, however, the internal os may also be divided in the manner hereafter to be described.

Some operators prefer this deep division of the cervix to gradual dilatation by tents in all operations for the removal of intra-uterine growths; others condemn them as an unnecessary mutilation. Whenever there is danger in delay (as in hemorrhage from fibroids or malignant growths in the uterine cavity, or when a sloughing fibroid calls for immediate removal) the bloody dilatation seems indicated. When there is no reason for haste, it is a matter of habit and fashion, to a great degree, which method is chosen. Recently Prof. Schroeder, of Berlin, has advocated these free incisions for all cases where the uterine cavity is to be thoroughly opened. He claims rapidity and safety for the method, and avoids subsequent mutilation by uniting the lips of the incised wounds by sutures as soon as the indication for which they were made has been fulfilled. The danger of wounding the circular artery which often runs close to the junction of vagina and cervix should be borne in mind. Besides, every such fresh wound is liable to be the channel through which septic germs enter the system.

The operation is performed by exposing the cervix through a Sims or Simon's speculum, seizing it firmly with the tenaculum and drawing it down as near the vulva as feasible. The pointed blade of Kuechenmeister's scissors is then passed into the cervical canal until the other hooked blade almost touches the vaginal roof on one side of the cervix. The point of the hook is then fixed in the mucous membrane to prevent the slipping down of the blades, and the intervening tissues divided with one sharp stroke. The scissors are now turned to the other side and the operation repeated; and so on with the anterior and posterior lips, if a quadrilateral incision is to be made. If additional shallow incisions are required to open the canal still more, a long blunt-pointed knife is introduced and the cervix divided about half-way through in two or more places. The divided flaps will generally curl out slightly, and readily admit the finger or a steel divergent dilator to complete the dilatation beyond the level of the vaginal insertion.

The hemorrhage is liable to be quite profuse, but will be arrested by the pressure exerted by the dilating finger or instruments. If the canal is to be left open, a carbolized cotton tampon or plug (soaked in a mixture of persulphate of iron and glycerine, and squeezed dry, or, what is equally good and much cleaner, a saturated solution of alum) should be inserted by forceps or on a slide-applicator and the incised canal tightly packed; besides, the hemostatic tamponade of the vagina should be added as a precaution. The vaginal tampons should be removed after twenty-four hours, the cervical not until it begins to loosen and come away itself. Carbolized irrigation of the vaginal and uterine cavity should precede the introduction and follow the removal of these tampons.

This operation, be it understood, is not intended so much as a cure of a stenosis of the cervix, than as a necessary precaution for operations on the uterine cavity.

Discission of the Cervical Canal—Bilateral Division (*Simpson's Operation*).

By discission of the cervical canal is meant the division of the whole canal from and through the external to and through the internal os.

This operation was first performed by Sir James Simpson, and consisted in passing his metrotome through the internal os, opening and rapidly withdrawing it with expanded blades; it was then reintroduced with the cutting edge turned to the opposite side, and the same maneuvre repeated. In this way a uniform division of the internal and external os was effected and the canal made of the same width throughout. By this operation the cervical canal is divided bilaterally, as shown in Fig. 181. To distinguish it from other methods, this operation has been named after its inventor and is known as Simpson's operation for division of the cervix uteri. Simpson was in the habit of performing it in his consulting-room, simply wiping out the incised canal with a brush dipped in a solution of perchloride of iron. As a result, a number of patients had severe hemorrhage and some died of metro-peritonitis, but unfortunately no statistics of these operations were ever published. This bilateral incision of the cervical canal is "applicable only to cases in which the intra-vaginal portion of the cervix is normally developed, in which the anterior and posterior segments of the cervix are symmetrical with the os pointing usually toward the posterior wall of the vagina." (Sims.) It is performed only for constriction of the cervical canal, and the consequences thereof, dysmenorrhea and sterility. Its object is solely to enlarge the canal, render it patent for the menstrual blood and the seminal fluid.

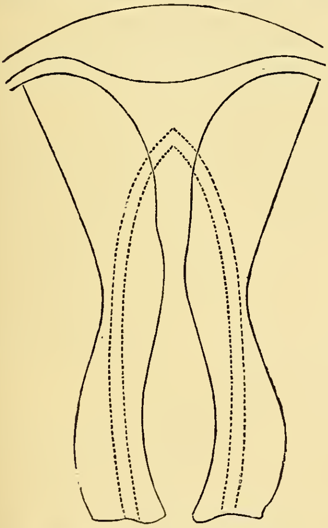

FIG. 181.—Lines of incision made by Greenhalgh's metrotome in bilateral incision of the cervical canal. (Hewitt.)

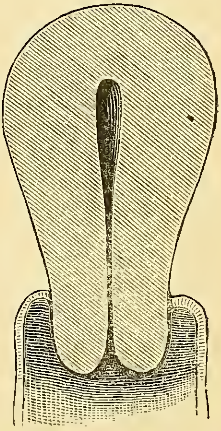

FIG. 182.—Transverse median section of normal uterus, as suitable for bilateral incision, if os is narrow.

The degree of constriction of the cervical canal which would call for enlargement by the knife is largely relative, or is a matter of opinion as to the absolute necessity of a patulous canal for the possibility of conception. Peaslee believed that the internal os should be divided when a sound of one-eighth of an inch diameter is unable to pass, and that the external os is too small when its diameter measures but one-sixth of an inch, or less. As a rule, we may assume that a cervical canal which readily permits the passage of a Simpson's sound is sufficiently wide to admit spermatozoa, and allow the menstrual blood to escape. But there are cases in which the sound is readily introduced, although the external os appears very small to the touch and the eye; in these, the lips are generally flabby, they fall together, and thus quite as effectually close the external os, as though that orifice were really contracted. Again, the sound easily passes through a portion of the canal, and is arrested near, or at the internal os by rugosities, pockets in the hyperplastic mucous membrane, even though the canal is perfectly straight and quite wide enough to admit the sound, which finally slips over the obstruction and glides into the uterine cavity. But these rugosities may, by dropping together—dovetailing, as it were—present an obstacle to the spermatozoa, if not to the menstrual blood. These two conditions, therefore, may be considered relative indications for discission; they constitute a practical, if not actual, contraction of the canal.

It is therefore well to formulate the indications for discission both on the physical condition of the uterine canal, and the symptoms of obstruction manifested. Thus, even though the external os be apparently large enough, if the cervical cavity be unduly dilated, as by retention of secretion, it is fair to assume that the orifice is relatively too small, and should be enlarged; and so also with the internal os and uterine cavity. I have frequently been compelled, for want of other appreciable causes, to assume that the dysmenorrhea or sterility was due to some obstruction in the uterine canal, although the latter *appeared* large enough ; and have then thought myself justified in dilating the canal, simply because that seemed the best manner of overcoming the difficulty.

A peculiar rigid condition of the normally large external os is spoken of by Chrobak as an apparent cause of sterility, and I have made the same observation in women in whom the cervix had been lacerated and the lips of the gaping os were rigid and undilatable through cicatricial induration. It seems as though mere patency of the cervical canal is not sufficient to insure conception; the consistence of the cervical tissues must be favorable to a dilatation of the os under the impulse of sexual excitement, and such a cervix of course does not need incision. The softening, alterative effect of sponge tents, iodine applications, glycerine tampons, and hot-water injections would restore the elasticity of the os.

A long conical cervix, with narrow external os and elongated uterine canal, may be benefited by combining the bi- or quadrilateral deep incision of the external os with the discission of the internal os. The deep division of the external os causes the lips of the cervix to roll out, and thus shortens the cervix. This shortening may not suffice, however, and the amputation of a portion of the cervix may be required.

The manner of performing this operation—Simpson's bilateral division of the cervix through the whole canal—as modified and improved up to the present time, chiefly by Sims, is as follows: It is not necessary to anesthetize the patient, for the pain is comparatively slight; but as the operation should invariably be done at the home of the patient, it may be as well to put her under ether, if she is at all nervous. The cervix is exposed through Sims' speculum (another will not do as well for this operation), and seized as usual with the tenaculum. The direction of the uterine canal is ascertained by the probe, and the metrotome, with its blades hidden, is passed up transversely through the internal os. The blades are then opened by the screw or pressure mechanism in the handle (the expansion of the blades and their cutting limit having been previously noted and the screw regulated accordingly) and the instrument is gently withdrawn.

In this country the metrotomes with hidden blades are but little used, but the knife introduced by Sims is almost universally employed. It consists of a stout handle in which several blades of different width and shape are fixed at will by a compression apparatus, as a needle is seized in the needle-holder. The blade to be used is fixed in the handle at an angle corresponding to the direction of the uterine canal, and gently insinuated through the internal os. One side of the cervix is then cut through to the external os; the knife is now introduced again, and the other side divided. A large Peaslee's sound is now inserted, and the dimension of the canal measured. If it is freely passable for a sound one-fourth of an inch in diameter, the operation may be said to be concluded. If any obstruction is felt, the knife is again introduced and the incisions are deepened. The cuts should be made with a gentle sawing motion. When the incision is sufficiently large, a stout dilator is introduced (Sims prefers his three-bladed, and it probably is the best for this purpose) and separated until it shows an expansion of one and one-half to one inch (the limit of the dilator). The cervix should not be drawn down and fixed with the tenaculum, because when the dilator is expanded the uterus will fly away, and the dilator escape from the cervix. It is better to push the dilator up to the fundus, and then gently press the uterus upward with it until the vagina is extended to its greatest length, and then make the dilatation. The uterus then cannot escape.

The canal having been thoroughly dilated, the cervix is again seized with the tenaculum, drawn down, and a smooth glass or hard-rubber plug (Fig. 183) introduced to arrest hemorrhage and maintain the canal patent. This plug is two inches long, and is made of different sizes, graduated by the English measure from No. 11 to 19. The large base prevents the plug from slipping into the uterus, and compresses the bleeding wounds at the exposed os. If the canal is not large enough to admit at least the No. 11 plug, it must be incised or dilated still more. Once introduced, the plug is held in position by a tampon soaked in the saturated solution of alum and placed directly over the cervix. The vagina is then tamponed in the manner described for hemostasis, the upper layers being also soaked in alum water, the lower in carbolized water.

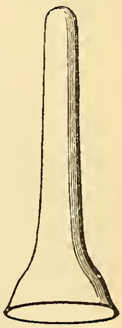

FIG. 183.—Sims' hard-rubber plug for discission of the cervix.

If the tampon interferes with micturition, or gives pain, the lower layers may be removed after a few hours. The patient is kept in bed, very quiet for forty-eight hours, the urine being drawn with the catheter. She must not sit up in bed or strain, lest the plug be dislodged. The lower layers of the tampon, up to the vaginal vault, may be removed on the third or fourth day, but if the upper layers look compact and fresh they should not be disturbed for two or three days longer. If there is a fetid discharge or rise of temperature, all the tampons should be at once removed, the vagina cleansed with carbolized water, and a carbolized cotton tampon again placed over the plug in the cervix. The plug may be left in until the tenth day, although usually the fifth or sixth day will suffice. The patient remains in bed for ten days, and is then transferred to the sofa; she must not leave her room until the next menstrual period has passed. The bowels should be regulated, after having been kept constipated for several days after the operation. After the first movement it is important to see whether the tampon has been displaced, and if necessary readjust it.

In former years Dr. Sims tamponed the cervical cavity after discission with a cotton plug soaked in the persulphate of iron solution. But this was nasty work, produced coagula, and aided in contracting the canal again. The pressure of the glass or rubber plug is quite as effectual in controlling hemorrhage, more so in keeping the canal open, and much cleaner and neater in every respect.

To remove the tampon layers one by one without displacing the upper layers, which are not to be disturbed, a useful instrument has been devised by Sims, called the tampon-screw (Fig. 126). It is of steel, with a double corkscrew tip, which is screwed into each cotton disk separately, and while the finger of the other hand holds down the bulk of the tampons, the screw removes the disk.

To insure patency of the canal frequent examination is necessary, the finger being thrust gently into the cervix as far as it will reach. Dilatation with sound or dilators may also occasionally be needed.

Antero-posterior Division (*Sims' Operation*).

The antero-posterior discission of the cervix consists in dividing the intra-vaginal portion in the median line, either anteriorly or posteriorly, or both, and extending the incision upward through the internal os. It is indicated in an entirely different class of cases from the bilateral operation, viz., in cases where the intra-vaginal portion of the cervix is unequally or abnormally shaped, the posterior segment being longer than the anterior, and the body of the uterus is anteflexed. The bilateral operation, it will be remembered, is suitable for cases of regular, uniform development of the cervix, without ante- or retro-flexion, where the only indication for operation is the narrowness of the uterine canal or the rigidity of the cervix. The so-called conical cervix forms a large contingent of the cases requiring this bilateral operation.

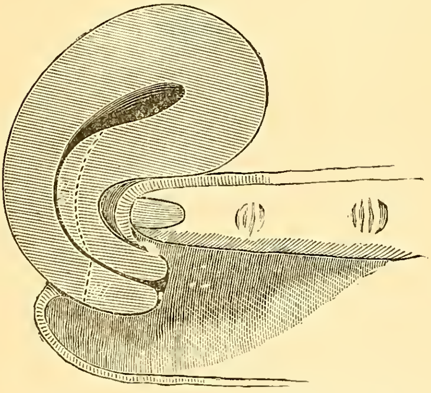

Fig. 184.—Lines of incision in anteflexion of the most marked degree. (Sims.)

The cases to which the posterior section of Sims is specially adapted are illustrated in the cuts Figs. 184 to 188, taken from Sims.

To perform this operation in a normally developed cervix would be entirely improper and unscientific. These figures represent different degrees of anteflexion, both of the body and of the cervix. The object of the operation—to straighten the uterine canal—is at once apparent from the direction of the dotted lines.

Dr. Sims lays particular stress on the unequal development of the cervix in these cases, the long, often thick and gristly posterior lip forming a direct obstacle to the ingress of the spermatozoa. The rationale of his plan of dividing the posterior lip and making a large opening to the uterine canal—an opening which, being situated opposite the deepest portion of the posterior vaginal wall, is nearest the pool of semen collected there after coition—is certainly plausible, and has been verified by many successes. That Simpson's operation would not achieve the same result is obvious on comparing the figures. The distinction between these two operations, bilateral and antero-posterior section, has only recently been emphasized by Sims in an article on the Treatment of Stenosis Uteri, published in Vol. III. of the "Transactions of the American Gynecological Society," from which the illustrations credited to Sims in this section are taken. As Sims' operation and views in this matter had been misunderstood until the explanation contained in the above article, I have been careful to reproduce the operation precisely as he gives it there.

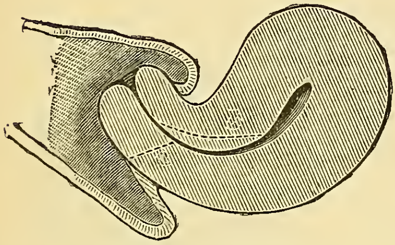

FIG. 185.—Lines of incision in anteflexion with retroversion. (Sims.)

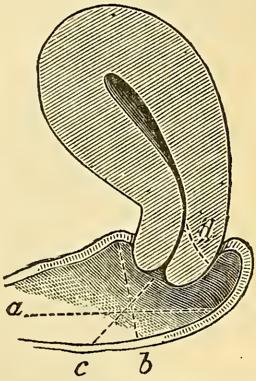

FIG. 186.—Uterus with faulty direction of external os: *a*, axis of vagina; *b*, normal direction of external os; *c*, present direction of external os; *d*, line of incision. (Sims.)

The manner of performing this operation is as follows: The direction, curve, and dimensions of the uterine canal having been thoroughly studied, the cervix is exposed through Sims' speculum, the anterior lip seized with a tenaculum, and the straight blade of Sims' metrotome "set in the handle with blade backward, is passed into the cervical canal until the point passes through the internal os. If the flexion is marked, the knife will not pass easily; a fine grooved director, bent at the required curve, should then be introduced and the knife passed in along the groove. The director is then removed and the constriction divided; with gentle cutting

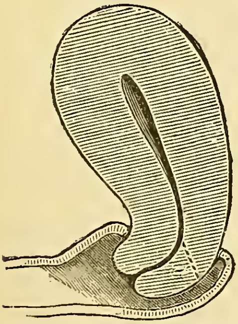

FIG. 187.—Division of thin posterior lip in anteflexed cervix. (Sims.)

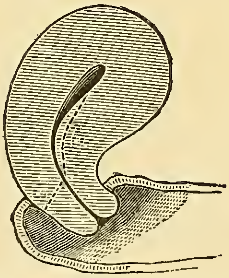

FIG. 188.—Lines of incision in acute flexion at the os internum. (Sims.)

motion the posterior portion of the cervix is split in a straight line back from the os tincæ nearly to the insertion of the vagina. The knife is then withdrawn, the blade is turned in the handle so as to cut anteriorly, and again passed into the canal of the cervix as before, and in withdrawing it the obstruction at the point of greatest flexure, at the os internum, is incised anteriorly. The blood is sponged away, and the trivalve dilator is used," and the plug introduced, and the wound dressed as already described. Sims formerly used the scissors for splitting the posterior lip, but now prefers the knife for this also. The passage of the knife through the internal os of an acutely flexed canal is often very difficult.

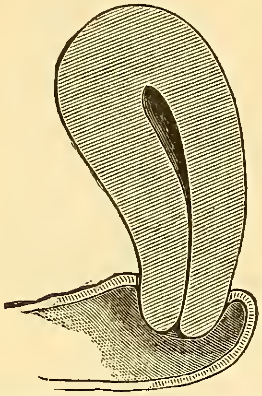

FIG. 189.—Uterus with cervix equally developed, but with constricted canal, suitable for Simpson's operation. (Sims.)

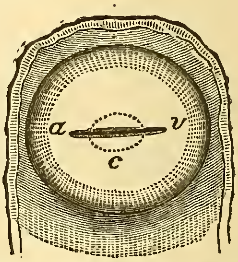

FIG. 190.—Bilateral division of os: *a*, *v*, lines of incision; *c*, size of os twelve months after operation. (Sims.)

The direction, length, and depth of the incisions are shown by the dotted lines in the cuts, and therefore need not be further described.

Accordingly as the operation of posterior section is done for anteflexion of the cervix, or anteflexion of the body, Emmet incises only the posterior lip and the posterior wall up to the internal os, or cuts through the anterior wall and through the internal os also. The lines of incision are shown in Figs. 191 and 192.

Emmet uses the scissors for the first incision, and completes the operation with the knife. The probe is carried into the canal as a guide to scissors and knife. Emmet tampons the cervix with glycerized cotton instead of the plug.

The after-treatment is precisely the same as after Simpson's operation.

The *dangers* of these two operations, Simpson's and Sims', are pretty nearly equal. After both we may have serious hemorrhage, peritonitis or cellulitis, septicemia, death. Sims admits two deaths, one after his, the other after the bilateral incision, among somewhat less than a thousand operations. He also speaks of two instances of hemorrhage from the circular artery, which was so severe as to require a suture-ligature to be passed through the cervix and tied over the anterior edge of the os. The artery was cut by the anterior incision. Dr. Emmet has also met with this accident. Of 105 cases which the latter operated on in his private hospital and the New York Woman's Hospital, there were three deaths from peritonitis, in each of which imprudence on the part of the patient might fairly be considered the chief factor. A number of cases of cellulitis occurred, but the exact figure is not given.

Since the use of his hard plug, Sims has not been troubled with hemorrhage after these operations; and Emmet states that the proper precautions adopted by him since the above-mentioned accidents (such as antiseptic treatment of instruments and wound, watchfulness, performance of operation only at a spot where a physician can be immediately procured in case of need) have prevented a recurrence of either hemorrhage, peritonitis, or severe cellulitis.

A compilation by Beigel of 900 cases by Tanner, Ballard, Sims, and Emmet, and Greenhalgh, shows 1 case of death from peritonitis, 2 severe hemorrhages, and 6 instances of cellulitis. Of German authors, Hegar and Kaltenbach had 2 deaths in 150 cases; Martin, 1 death and several hemorrhages in 386 cases; Carl Braun, 291 cases with 1 hemorrhage and 1 cellulitis; Gustav Braun, 107 cases with 4 of peritonitis; Kehrer, 86 operations with 4 cases of cellulitis and peritonitis and 1 death; Chrobak, 250 cases, with 2 hemorrhages and 2 attacks of cellulitis, up to 1876, since then, 50 operations without accident. Thus, among 2,275 collated cases, together with the unnumbered ones of Sims, certainly in all 3,000, we have 10 deaths. The cases of severe peritonitis, cellulitis, and hemorrhage are not recorded with sufficient accuracy to be of value, but were certainly as high as twenty per cent., all together. One great defect of these statistics is that it is not mentioned in many of the foreign cases whether only the external os, or the internal os also was incised. This may account for Carl Braun's want of accidents, for, of course, the mere division of the external os is but a trifling matter. The depth of the incision through the internal os depends, in Sims' method, greatly upon the dexterity and experience

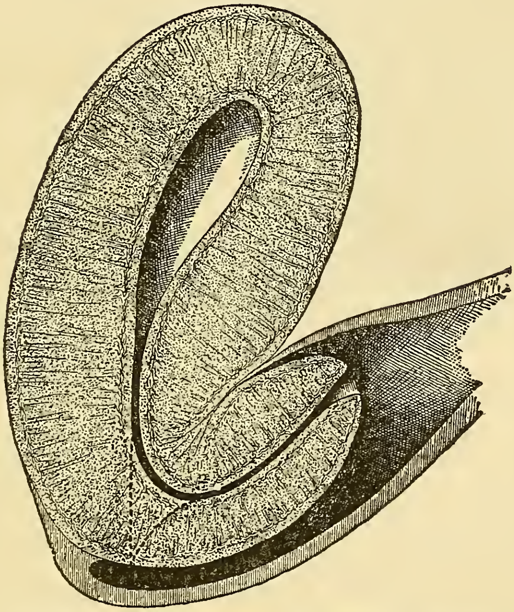

FIG. 191.—Lines of incision in flexure of the cervix. (Emmet.)

of the operator, since only a practised finger can tell how deep and where to cut. As a rule, it is better to err on the safe side and not cut too deep, and if the operator is not rashly bold, this is generally the case. Only a very practised operator, like Sims himself, will be able to gauge precisely how deep he may cut without wounding the circular artery or the peritoneum. If the mechanically working metrotomes are used, the cut may be too small if one does not allow for the elasticity of the tissues, and too large if the screw is set so as to expand the blades more widely in anticipation of this elasticity. The knife is therefore thought to be the safest instrument.

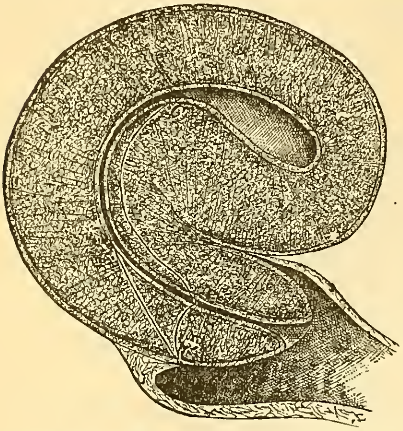
Fig. 192.—Lines of incision in flexure of the body. (Emmet.)

With the proper precautions, and carefully omitting all cases to be mentioned under counter-indications, the operation of division of the cervical canal and internal os, according to Simpson or Sims, may be considered as not especially dangerous. Sims contends that it is no more dangerous than forcible, rapid, or gradual dilatation, while much more effectual. His wonderful dexterity no doubt accounts for his good results and his immunity from accidents since the adoption of his improved method, as above described. An inexperienced operator will probably do far less damage with dilatation by non-cutting instruments.

The *counter-indications* are again the same as repeatedly stated for all manipulations on the uterus: all acute, subacute, and chronic inflammatory conditions of the pelvic organs; purulent discharge from the uterus, which might infect the wound; the proximity of the menstrual period (one fatal case by Emmet, and two severe cases of cellulitis by Chrobak were due to the performance of the operation a few days before menstruation).

The *curative value and permanent benefit* of these operations is by no means assured; for statistics of successes, as regards the relief of dysmenorrhea, and chiefly as regards conception, have not been furnished by the operators whose figures were quoted above. Frequent isolated cases of speedy conception, after the operation, have been reported by all of them, but an exact proportion of successes and failures has not been published. Of the 483 discissions (whether external os, or internal os also, is again not stated) performed by Haartmann, G. Braun, Martin, Kehrer, and Chrobak, 148, equal to 30.7 per cent., were successful. But whether the dysmenorrhea or sterility were cured is not stated in a sufficient number of cases to be of value. A large and careful statistical compilation of the indications, exact method of treatment, and results as regards cure of dysmenorrhea and sterility, by the various methods of bloodless dilatation, the Simpson, Sims, and Peaslee operations, and the simple division of the external os, respectively, would be exceedingly interesting and of immense practical value.

So much appears certain that, *ceteris paribus*, an open external os and straight and large cervical canal is more favorable to impregnation, than a small external os, and narrow and crooked canal. If, therefore, no other cause for the sterility can be ascertained, but a narrow cervical canal, it is fair to assume that this is the cause of the sterility, and to give the patient the chance of cure by enlarging it.

The impossibility of recognizing the cause of sterility in those cases in which ovarian disease or encapsulation of the ovary in adhesions, or stricture of the Fallopian tubes, or imperfect maturation of the ova, are at fault, will, of course, render any efforts at cure, by discission or otherwise, futile. In estimating the value of statistics on this subject, this fact should be taken into consideration.

The great difficulty with all operations for dilatation of the cervical canal, bloodless or by cutting instruments, is the persistent tendency of the canal to contract again. Even the most widely opened canal will be found in a few months as small as before, and if cicatricial contraction has chanced to be exceptionally great, it may even be smaller than before the operation. Or, the divided lips may unite unequally, so as to form flaps which obstruct the entrance to the external os. Or the edges of the enlarged os may become dense, gristly, and unyielding. Or, the incisions through the intravaginal portion may have been so deep, and the retraction of the flaps so great, that an eversion of the cervical mucous membrane, an ectropium, as after parturition, takes place, and the flaps require to be united by paring their edges and inserting silver sutures, as devised by Emmet for puerperal laceration. Careful attention to the after-treatment will hinder the contraction of the canal, and avoidance of too deep or unequal incisions will prevent subsequent malformation or ectropium.

Superficial Trachelotomy (*Peaslee's Operation*).

In the belief that the two operations just described, the deep bilateral, and the deep antero-posterior section, were unnecessarily severe, produced too large an injury, and left a mutilated cervix and gaping os, and were furthermore often followed by serious and fatal results, Dr. E. R. Peaslee devised and practised an operation, which consisted in merely cutting through the external or internal os, or both, if one or both were constricted, to a depth sufficient to make the canal of the average width of a parous woman. According to Peaslee, if the external os does not easily admit a sound one-sixth of an inch in diameter, there is stenosis as to conception; if no more than one-seventh of an inch, probably also dysmenorrhea.

If the internal os readily admits a sound one-sixth of an inch in diameter, there is no absolute but possibly relative stenosis; *i.e.*, passage for the sound, but not for fluids. If a sound of one-seventh of an inch is easily passed, there is still no stenosis, unless the symptoms indicate obstruction. This is the normal size in the imparous woman, and the size of Simpson's sound.

If a sound but one-eighth of an inch in diameter cannot be passed through the internal os, there is stenosis, or flexion.

In an external os of one-seventh or one-sixth of an inch, and an internal os of one-eighth of an inch, absolutely, and one-seventh of an inch, relatively, the operation of superficial trachelotomy is indicated. If congestion of the uterus is superadded to the above diameters, the operation is still more called for, and even an internal os of one-seventh of an inch may require division.

The constricted canal is now to be enlarged to the average size in the healthy woman who has borne children, which Dr. Peaslee says is rather less than one-fourth at the external os, and slightly less than one-fifth of an inch at the internal os. He therefore thinks that an enlargement to one-fourth of an inch at the external, and one-fifth of an inch at the internal os, is amply sufficient for all practical purposes for the relief of dysmenorrhea and sterility. If congestion is present, the limit may be extended to one-third of an inch, and to nearly one-fourth of an inch, respectively.

The incisions are not made to the same depth in every case, but very rarely extend deeper than through the mucous membrane at the internal os, perhaps barely nicking the submucous stratum.

The instrument with which this operation is performed is seen in Fig. 193. It consists of a flattened tube eight inches long and seven-sixteenths of an inch wide, except the terminal one and three-fourths inch, which has a width of but one-eighth of an inch. In this tube a blade slides easily, with a nut and screw at the proximal end to gauge the extent of its passage into the cervical canal. The blade has a blunt point, and lateral cutting edges for one and five-eighths of an inch at the distal end. There are two blades for each instrument, the cutting portion of one being one-fourth of an inch wide, of the other three-sixteenths of an inch. If the stenosis is confined to the internal os, the narrower blade only is used; if both ora are contracted, the wider blade is passed through the external, and the narrower blade then through the internal os. In decided congestion the wider blade may be passed through the internal os also, which will then easily admit a sound one-fifth of an inch in diameter.

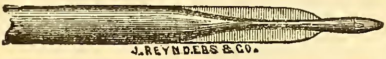

FIG. 193.—Uterine portion of Peaslee's metrotome with blade protruding.

The operation is performed through the Sims speculum, or the metrotome may be guided on the fingers like the sound.

The tube is passed into the cervical canal up to the shoulder, and therefore one-fourth of an inch through the internal os. The blade is then passed in, having been previously gauged, and carried up as far as necessary to divide the stenosis. If the external os is too narrow to admit the instrument, it may be nicked with a bistoury.

The operation is not at all dangerous, and Dr. Peaslee reports having performed it many times in his office, sending the patient home to bed after a short time. Out of over 300 operations he saw but one case of slight abdominal tenderness for several days, and twice slight cellulitis at the Woman's Hospital, in patients who had had cellulitis before. The patient is kept in bed for two or three days and not allowed to walk for a week. The conical dilator of the corresponding size is passed immediately after the removal of the metrotome, and every other day for a week, and once a week for two or three weeks longer.

Dr. Peaslee claimed to have obtained by this operation a uterine canal of the average normal width in the healthy parous woman, as shown in Figs. 194 and 195.

The results of this operation have not been stated, any further than that its author asserts that "it removes stenosis perfectly, and in most cases permanently, since there is very little tendency to closure of the slight incision made." If the cervical canal really retains the width given it by Peaslee's operation, it is evidently sufficiently large for all practical purposes, as regards the cure of dysmenorrhea and sterility, and

Simpson's operation should be abandoned as unnecessarily severe and dangerous. Sims' operation, be it understood, does not come under this category, being designed for a different class of cases, namely, anteflexion and distortion of the cervix.[1]

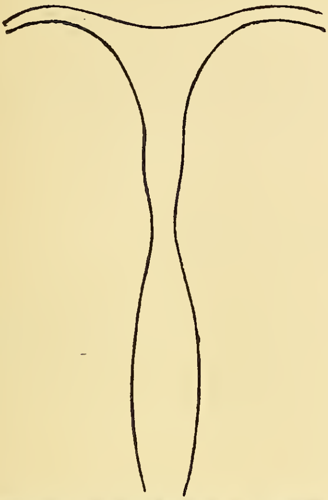

FIG. 194.—Normal uterine cavity. (Peaslee.)

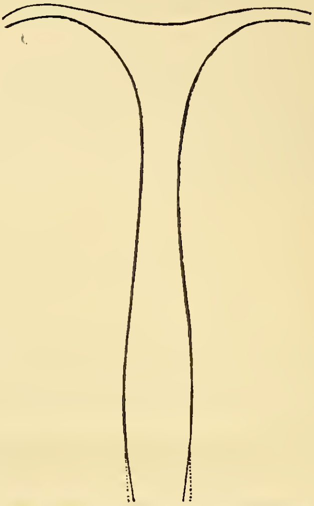

FIG. 195.—Uterine cavity as enlarged by Peaslee's operation. (Peaslee.)

I am not aware whether subsequent observations have proved the permanency of these superficial incisions recommended by Dr. Peaslee. In view of the prevalent tendency to bold surgical measures, his advice should certainly be heeded and put to the test.

Wedge-shaped excision of the lips of the cervix.—In some cases the only obstruction to the entrance of the seminal fluid into the uterus seems to be a peculiar formation of the lips of the external os, by which the anterior lip closes, as with a valve or apron, the entrance to the cervical cavity. Fig. 196 shows this formation. To remove this obstruction is obviously the indication.

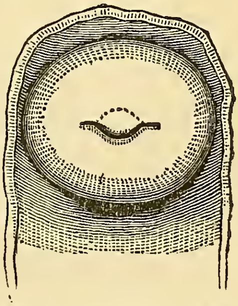

FIG. 196.—Projection of anterior lip of cervix. Dotted line marks incision for removal of wedge.

The nature of the operation is shown by the dotted lines in the figure. A straight sharp- or blunt-pointed bistoury is passed into the external os and the overlapping anterior lip (it is seldom the posterior) is cut out for about a fourth of an inch, the piece removed having the shape of a short wedge. This little operation can be performed at the office, and is entirely devoid of danger. It leaves a triangular os (similar to that shown in Fig. 180), which should be kept open by first inserting a cotton plug for several days, and then occasionally separating the lips with a branched dilator until permanent cicatrization has taken place.

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[1] It may be well to avoid misunderstanding by saying here that Dr. Peaslee's idea of the operation which he called Sims' in his celebrated article on Incision and Discision of the Cervix Uteri, read before the New York Academy of Medicine, June 1, 1876, and published in the American Journal of Obstetrics for August, 1876, has been pronounced erroneous by Sims himself in the paper above referred to on Stenosis Uteri, published in the American Gynecological Transactions, Vol. III., 1878. Dr. Peaslee, it would seem, labored under a misapprehension, and mistook a modified Simpson operation for that which Sims wishes to be called by his name, the antero-posterior section.

Other complicated excisions of the substance of the cervix for the purpose of maintaining a patulous external os, have been devised by Simon, Kehrer, and others. Their consideration involves so much description, and their adoption has not as yet been assured, so that I am compelled to omit them from this work.

VIII. Curetting of the Uterine Cavity.

By curette, or scoop, we understand an instrument shaped like a spoon, which is designed for the removal, by a scraping, tearing, or cutting action, of certain pathological tissues. The curette was first introduced by Récamier in 1846, and has since become exceedingly popular, both in its original and various modified shapes. Many authorities pronounced the practice barbarous and unscientific (Chassaignac, Becquerel, Dubois, Scanzoni, Credé), but in vain: the curette maintained its fame and increased in popularity. And no wonder, for it enabled the surgeon to remove in a few moments with perfect certainty, safety, and almost without pain, pathological tissue which by caustics and acids could scarcely be removed in weeks. If it was unscientific, it was effectual, and it certainly is no more barbarous to scrape out a cancerous cervix or a uterus for vegetations, than to cauterize the surface with fuming nitric or with chromic acid.

One or the other form of curettes has therefore now become a necessary instrument to the gynecologist. There are four varieties of curettes in present use: the dull copper-wire loop, of Thomas; the long subacute spoon, of Récamier; the sharp cutting loop, with flexible shank, of Sims; and the sharp cutting spoon, with stiff shank, of Simon. Of these, each has its special indications and dangers, and will, therefore, be described separately.

The Dull Curette of Thomas.—The copper-wire curette, without cutting edge, was devised by Dr. T. G. Thomas. It is an instrument nine inches long, three and one-half inches of which form the wooden handle, made of soft copper wire, one-sixth of an inch near the handle and tapering down to one-twelfth to one-sixteenth of an inch in thickness at one-half inch from the end, where it is so bent into an elliptical loop one-fourth of an inch broad, the wire at the loop being flattened on the scraping surface. The wire at the inception of the loop is so soft and flexible that any greater than a superficial pressure will cause it to bend, whereby a deep injury to the uterine mucosa is absolutely avoided. Besides, at the junction of wire and handle, the former is grooved, so as to bend easily at the point, also with the object of preventing firm pressure. The breadth of the loop mentioned above, one-fourth of an inch, is the usual size; but there are two other sizes made, one larger and one smaller, in proportion to the patency of the cervical canal.

It may seem that this flexible blunt loop of wire is too frail to be of real service, but experience has amply shown that it fully answers the purpose for which it was intended, and that gently drawing it over the uterine mucous membrane suffices to detach the projecting vegetations or granulations and to cure the case, without requiring or subjecting the patient to the danger accompanying the use of a stiff sharp steel scoop.

Indications.—There is really only one indication for the use of the curette, and that is pathological uterine hemorrhage, menorrhagia or metrorrhagia, which has resisted all other remedies, and for which no physical cause, constitutional or local, can be detected by the usual means of exploration. In such a case we are compelled to look for the cause of the hemorrhage in some intra-uterine disease, not distinguishable by the ordinary digital and specular examination. The curette will then give us the required information, for by it we shall either remove a portion of the *fons et origo mali*, or receive a negative result at least, in the assurance that the uterine cavity is empty and healthy. The first and chief use of the curette, therefore, is as a *means of diagnosis*, and as such it must be employed in almost every case until its withdrawal shows the presence or absence of an exciting cause. The unirritating nature of the operation with the wire curette renders this procedure entirely justifiable and harmless, while sufficiently effective. Having thus ascertained, by means of the curette, what the cause of the hemorrhage is, if located in the uterus, we find that it is one of three *conditions requiring the therapeutic employment of the curette.* These are, taking them in the order in which they are commonly met with: 1. Chronic hyperplastic endometritis, or fungous degeneration of the uterine mucous membrane. 2. Retention of adherent placental villi after miscarriage. 3. Diffuse sarcoma of the mucosa of the body of the uterus.

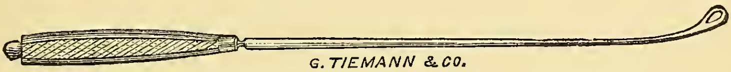


FIG. 197.—Thomas' dull copper-wire curette.

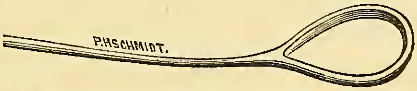


FIG. 198.—Thomas's curette, medium size.

1. Endometritis hyperplastica chronica or polyposa (Olshausen), fungous degeneration of the uterine mucous membrane (Thomas), fongosités utérines (Récamier), endometritis chronica (Hegar and Kaltenbach), metritis hemorrhagica (Weber, St. Petersburg), metritis villosa (Slavjansky), manifests itself by three separate anatomical conditions: (*a*) diffuse, low granulations, developed in patches, eroded and ulcerated by chronic catarrh, or spread over the whole mucosa, similar to granular conjunctivitis (Atthill); (*b*) a uniform general hyperplasia of the whole mucosa of the uterine body without polypoid formations, "an unhealthy pulpy condition of the mucous coat" (Tanner); and (*c*) numerous polypoid fungous vegetations scattered over the hyperplastic mucosa, the endometritis polyposa of Olshausen. In this last category might be included mucous polypi, which, however, are rare in the cavity of the uterus proper, and are generally confined to a limited portion of the endometrium.

All these pathological conditions are well known to produce hemorrhage, which is arrested only by the removal of the exciting cause. The masses removed by the wire curette in class *a* will generally possess more the character of fine shreds and turbid bloody mucus without actual distinct pieces of tissue, the curette merely crushing and obliterating the flabby granulations; in class *b*, soft pale slices and irregular patches will come away; and in class *c*, distinct, flattened, polypoid vegetations, varying in size from a millet-seed (the usual size) to a pea or bean, and soft and pulpy in consistence.

Occasionally all these neoplasms are combined, and removed in the same case.

The vegetations, or fungosities (according to Dr. M. D. Mann, pathologist to the New York Obstetrical Society), consist histologically of structureless basement substance, containing great quantities of small, round cells and nuclei, and portions of uterine follicles and vessels. Granulations have no follicles.

Olshausen states that endometritis polyposa strongly resembles the broad based molluscum of the corpus uteri described by Virchow, the great difference being, however, that in the latter affection large masses of dilated glands are found, which are absent in the former. A microscopical examination will usually be required to determine the exact nature of the masses removed, should there be any doubt on the matter. It should further be stated, that endometritis polyposa is limited strictly to the cavity of the uterus proper, stopping at the os internum, below which commences the region of enlarged Nabothian follicles and mucous polypi, for the removal of which Thomas himself recommends Sims' sharp curette.

Endometritis polyposa is not confined to the married or parous woman, but occurs also not unfrequently in the single female, even after the menopause. It generally owes its origin to a chronic catarrh of the endometrium, the ordinary muco-purulent discharge of which has gradually become more sanious or pure bloody, accompanied by profuse menstrual flow, and gradually increasing anemia, and general debility. The previous existence of a profuse chronic leucorrhea will, therefore, convey a suspicion of the presence of this affection. The local symptoms are often slight, generally merely the ordinary pelvic weight and dragging met with so commonly in uterine disease. The cervix is usually soft, the external os often more or less gaping, and the cervical canal and internal os patulous. The finger passed into the uterine cavity will feel the mucous membrane swollen and spongy. To detect the vegetations themselves by the touch would scarcely be possible, owing to their scattered site, small size, and pulpy consistency. No one portion of the endometrium seems particularly favored by these growths, for I have removed them with the curette from either surface. The number of vegetations may vary from two or three to a dozen, or a whole teaspoonful or more, their size from a millet-seed to a bean, the latter being rarely met with.

When we consider how easily the diagnosis of this affection is now made by the curette, we must wonder at its having been so rarely recognized, and so little appreciated, as it undoubtedly has been since its discovery some thirty years ago. The explanation given by Olshausen for this neglect is probably the correct one, namely, that the sharp curette having been proscribed, the only means of diagnosis of the affection was by the finger, after opening the canal by laminaria or sponge tent (still the only method advised by Atthill, in 1873), the former of which flattened out the growths and rendered them impalpable, and the removal of the latter destroyed them.

After what has been already said, it seems scarcely necessary to remark, that constitutional treatment is of no avail whatever for the cure of this affection, and consists only in remedies designed to support and restore strength. Topical applications of caustics (argenti nitras, tincture of iodine, liq. ferri persulph.) have by long experience been found but temporarily beneficial in arresting the hemorrhage; stronger caustics, such as nitric and chromic acid, will, it is true, convert the whole surface of the uterine mucosa into an eschar, and thus probably cure the disease. But as, in any case, the disease, with its exciting cause, is liable to recur, and as the use of these strong caustics is always attended with more inconvenience, pain, and danger than are ever found to result from the simple operation with the wire curette, the latter instrument should invariably be preferred to caustics in these cases.

2. Placental villosities are very frequently detected in utero after a miscarriage, particularly when the placenta was expelled alone, after the birth of the embryo, or was manually removed. These patients generally continue flowing after the miscarriage for a longer or shorter time (often profusely), until their weakened state finally obliges them to seek medical advice, usually after the fruitless employment of a variety of constitutional hemostatics. Should the cervical canal still be sufficiently patent, the finger will readily detect an irregular, rough, circumscribed spot on the endometrium. Or what is equally positive and more applicable, through the generally contracted os, the curette makes that discovery, and at once removes a fragment, the macro- and microscopical appearance of which readily assures the diagnosis, and points out the immediate cure of the hemorrhage, by the removal of its exciting cause.

3. Diffuse sarcoma of the uterine corporeal mucosa is a very rare disease, only sixteen instances of which have, according to Schroeder, been recorded in literature. It should not be confounded with sarcoma of the parenchyma of the uterus, which is decidedly more frequent, and resembles, in its macroscopical characteristics, the ordinary fibroid tumor of the uterus. Diffuse sarcoma of the mucous membrane is confined almost exclusively to the body of the uterus, only two cases of its occurrence in the cervix being recorded (both by Spiegelberg), and appears as a soft, flabby, villous growth, spreading over a greater or lesser surface, and rapidly assuming an irregular polypoid shape. It is in its early stages only, that it is amenable to treatment by so simple an instrument as the wire curette ; later on the sharp scoop or the galvano-cautery are required. The differential diagnosis between diffuse sarcoma, unusually prolific vegetations, and retained placental fragments, can, as a rule, be made with certainty only by the microscope, and is then easy enough, the distinctive histological features of each of these masses being sufficiently characteristic. The symptoms of diffuse sarcoma in the early stages resemble those of endometritis polyposa, but the hemorrhage is generally more profuse, and alternates with watery discharges frequently mixed with shreds, and there is often more or less pelvic pain.

Another class of cases in which the wire curette can be advantageously and safely used, are those of carcinoma of the cervix, in which, after amputation, the sharp scoop or cauterization, fresh, readily-bleeding granulations spring up. These I have repeatedly removed off-hand with Thomas' curette, applied nitric or chromic acid, or bromine, or sol. ferri persulph., and sent the patient home. Large masses of cancerous tissue would, however, require a more powerful instrument, like Simon's sharp scoop, the use of which should be attended by all the precautions employed during and after a serious operation.

Manner of using the wire curette.—As a rule, it is not necessary to anesthetize the patient; indeed, I have never done so, for nearly all my cases were operated on at my office or at the dispensary, the patient being dismissed to her home immediately after, with the direction to remain quiet for twenty-four hours, and to avoid exposure to cold. Still, in exceptionally sensitive or nervous patients, it may be advisable to use an anesthetic.

It is doubtless possible to introduce the curette into the uterus, and scrape over more or less of its cavity through a bivalve or cylindrical speculum, or without a speculum, on the finger only; but such a procedure can be at best incomplete (then truly performed "almost at random," as Atthill says), because the narrow field afforded by the specula named prevents free movement of the instrument. An inflexible steel curette can doubtless accomplish its purpose when simply introduced on the finger, and I have repeatedly removed both carcinomatous masses and large masses of placenta in this manner with Simon's scoop, guarding uterus and instrument with the other hand on the abdomen. But the only true way of operating with Thomas' curette, is through Sims' speculum in the left semiprone position.

The patient having been placed in Sims' position, and the cervix being exposed with Sims' speculum, the operator seizes the anterior lip of the cervix with a tenaculum, draws the uterus gently down, thereby straightening its canal and holding it steady, introduces the sound or probe to ascertain the direction and length of the uterine canal. Bending the shank of the curette, in accordance with the information thus obtained, he passes it into the cavity of the uterus, which he carefully explores by drawing the curette gently over the whole mucous membrane, always in the direction from the fundus to the internal os. Should the vegetations be large or very numerous, or the mucosa much hypertrophied, a certain feeling of resistance or a rough grating sensation will be imparted to the finger of the operator, revealing to him the presence of the neoplasms. In case of adherent placental remnants, this grating sensation is particularly distinct, and can even be faintly audible to the bystander. A very slight flow of blood accompanies this operation, never more than a tablespoonful or two. Having completed the tour of the uterine cavity the curette is withdrawn, bringing with it blood, and if present, vegetations, placental fragments, or carcinomatous masses. These are easily secured and detected by wiping out the vagina with dry cotton, on which the small, pale, flat, elongated, homogeneous-looking vegetations, or the firmer particolored placental fragments, are readily discernible amid the coagula. The detection of sarcoma will devolve on the microscope. If the operator wishes to make sure that all neoplastic formations have been removed, the curette may again be introduced, and the vagina then tamponed with cotton soaked in glycerine, and the patient dismissed. In severe cases a dose of morphine may be ordered after the operation; but as a rule no other immediate after-treatment than rest is required. I have been in the habit of painting the whole of the uterine cavity, immediately after cleansing it with cotton, with Churchill's tincture of iodine, as a styptic and caustic (although really not needed as such), and chiefly as a disinfectant and alterative, to insure the thorough destruction of the neoplasms and the absorption of the hyperplastic tissue; in protracted cases, where the number of vegetations was great or the hemorrhage profuse, I have left a tent of cotton soaked in iodine in the uterine cavity, allowing it to be expelled by uterine contractions after several days. I have never seen the least ill-effects from this treatment, but do not deny that I may be mistaken in considering it more efficacious than the simple painting of the cavity.

Should the neoplasm be discovered to be sarcoma, the cavity of the uterus must be thoroughly opened by laminaria or tupelo, and nitric acid or the galvano-cautery applied.

As a rule the external os is, even in nulliparæ, sufficiently patent to admit the curette, and the same may be said of the internal os, which the profuse hemorrhage has tended to dilate. Occasionally, when even the smaller sized curette will not pass, I dilate the internal os with Ellinger's steel two-branched dilator, and then experience no further difficulty. Dilatation with tents is rarely required. The pain attending the operation of curetting, as above described, is usually but slight; it occupies barely five minutes, and the reaction is *nil.* Where feasible, it is advisable to avoid all risks, and perform the operation at the house of the patient or in a hospital, and keep her in bed for twenty-four hours afterward. The simple introduction of the sound has produced cellulitis and metroperitonitis; it cannot be denied, therefore, that the wire curette *may* at any time (although thus far it has not done so), in a peculiarly susceptible patient, light up a similar trouble. But an ordinary diagnostic exploration of the uterus with the curette, and the removal of a number of vegetations, is really an almost innocuous procedure, and not likely to be followed by evil consequences, even if performed in the physician's office.

It must be borne in mind that, if the diagnostic curetting does not detect any cause of the hemorrhage, at all events no harm has been done, and the negative answer is in itself valuable information. Cases are even met with in which the curetting, while not detecting any neoplasm, still cures the metrorrhagia apparently by its alterative stimulant action on the relaxed uterine mucous membrane. And this is doubtless the manner in which it benefits cases of granulation and diffused tumefaction of the endometrium without vegetations.

If the uterine mucous membrane is healthy the wire curette will not injure it, and no shreds will therefore be removed; with the sharp curette, however, even the most delicate and practised hand can scarcely avoid shaving off slices here and there, the depth of which lesions cannot always be foreseen. It is this latter diagnostic curetting which must be termed harsh and "unscientific."

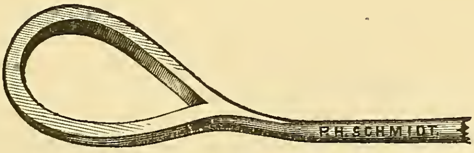


FIG. 199.—Large dull curette for removal of placenta after abortion, natural size; length of whole instrument, sixteen inches.

Counter-indications do not really exist, except such as would equally prohibit the introduction of the sound, viz.: acute or moderately recent pelvic or uterine inflammation, which should first be allayed by appropriate means before hazarding the curette.

I have employed the dull curette many times, and have never failed to cure the case when the diagnostic curetting showed the presence of any of the benign neoplasms described above. In certain cases of hyperplastic or subinvoluted uterus, with large cavity and gaping orifice, a larger sized curette, (Fig. 198) which occupies about the middle place between the small scoop shown in Fig. 197, and the largest size seen in Fig. 199, will enable us to remove, with far more certainty, every vestige of pathological tissue, which might here and there escape the smaller instrument. The large curette seen in Fig. 199 is used solely to remove the whole placenta or portions of it immediately or within several days after abortion, so long as the cervical canal is still sufficiently open to admit it. It is not used with a scraping motion when the whole placenta is to be removed, but pries the organ off from the uterine wall by gentle oscillatory movements, until the whole is detached, when it is removed by long broad-bladed forceps. If only small lobes of placenta or diffuse villosities are to be removed, the usual scraping action is employed.

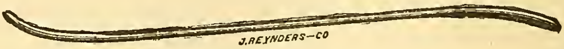


FIG. 200.—Récamier's subacute curette.

The subacute curette (*Récamier's*), is represented in the cut. It is used very much in the same manner as the dull scoop, except that the scraping action is exercised from side to side, and not from above downward. The peculiar shape of the instrument and lateral situation of its subacute edge accounts for this.

The indications are precisely the same as those for the dull curette, and need not therefore be repeated. I decidedly prefer the former instrument, as more safe while quite as efficient. Récamier himself met with three cases of death from perforation of the uterus by his curette; Demarquay with two; Chamberlain, of New York, saw a case of hysterical tetanus therefrom; Peaslee a death from collapse; Thomas a narrow escape from the same cause, and Barker a case of peritonitis.

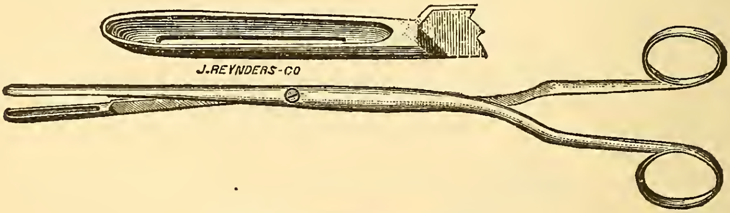


FIG. 201.—Emmet's curette-forceps.

Nevertheless, it is still kept in the shops and used by many operators.

Emmet has devised a curette-forceps, which resembles a double Récamier's curette. With it he crushes and removes the uterine vegetations, as he claims, quite as effectually as can be done by the ordinary curette.

The *sharp curette with flexible shank* (Sims') consists of a steel loop with sharp, cutting edge, and with a steel shank sufficiently flexible to permit its being bent in any case to suit the uterine canal, and to prevent too much force being exerted during the operation. It may be made of several sizes, the one usually employed being the smaller instrument in the cut.

Indications.—Whenever a dull curette can be employed, there also may a sharp scoop be used, if the operator feels sufficiently skilful to avoid doing injury. But, as already stated, what can be done by a safe, and withal efficient instrument, should not be performed by another possessed of more dangerous qualities. Therefore, all ordinary, benign vegetations and hyperplastic conditions of the endometrium should be treated by the dull curette; and only when these vegetations acquire the suspicion of malignancy by their repeated return, or their microscopic appearance reveals the presence of heterogeneous tissue, or the scrapings are of undoubted malignant character, is it indicated to remove them and their substratum by a more powerful instrument. The sharp curette then comes into play within the uterine cavity. It should, of course, be handled carefully, in order not to cut too deeply and perhaps perforate the uterine wall, as happened to Spiegelberg and to Chrobak while curetting a sarcoma of the uterine cavity. Only unjustifiable, brutal force could possibly perforate a normal uterine wall with Sims' curette.

Where it is desired, therefore, to remove all pathological tissue *thoroughly*, even down to the muscular coat, the sharp curette should be employed.

Another special indication for Sims' curette is a chronic, intractable endotrachelitis depending on hyperplasia of the cervical glands and associated with redundancy of the interglandular structure of the cervical mucous membrane. Mild applications, even strong acids, fail to destroy the redundant tissue, and only its complete removal will cure the case. This is easily, safely, and almost painlessly done by the sharp curette. The dull curette is not sharp enough and too flexible to scrape away the dense tissue, which may even need the inflexible scoop of Simon.

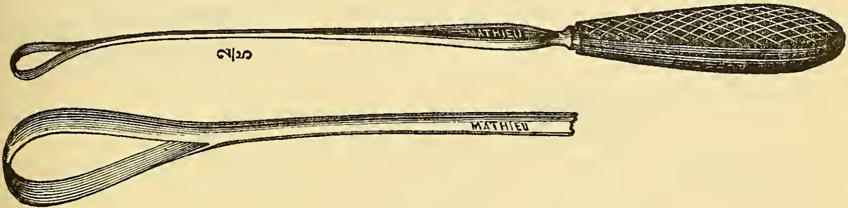


FIG. 202.—Sims' sharp curette, with flexible shank.

The sharp curette is used through the Sims speculum precisely like the wire loop. Of course the cervix must be sufficiently dilated to permit its easy passage and handling. The swabbing of the uterine cavity with tincture of iodine, iodized phenol, even nitric acid is indicated more after the sharp than the dull curette, in accordance with the gravity of the disease calling for the operation. In the cervical cavity the above caustics are usually applied after the curetting. If the external os is too small to admit the curette, it must be dilated or incised, as already described.

The sharp curette with inflexible shank (Simon's) was devised by the late Prof. Simon in 1872, for the removal of cancerous tissue from the cervix uteri, in incurable cases, and for scraping out old lymphatic-gland abscesses and carious bones.

The instrument is composed of stiff, inflexible steel, the edge of the scoop being decidedly sharp, and the spoon itself quite deep and not perforated. There are five sizes varying from that of a lentil to a small almond, with different curves of the stems to correspond to the various parts of the uterine cavity. The steel stems are fixed in stout wooden handles, the whole being of sufficient length (ten inches) to permit of their being passed into the uterine cavity without the aid of the speculum.

The *indication* for these stiff scoops is the removal of soft, fungous, bleeding granulations in cancer of the cervix, which has spread so far into the parametrium as to render the complete removal of the diseased tissue impossible. These granulations bleed and discharge freely, and thereby greatly debilitate the patient. Active caustics do not destroy the bleeding masses thoroughly, and besides are not quite safe owing to the proximity of the bladder, rectum, and peritoneum. In the curette we possess an instrument which enables us to remove these bleeding, cancerous masses rapidly, safely, and effectually. With the larger sizes the whole surface is quickly scraped clean, and with the smaller scoops the crevices and cavities in the cervix are gouged out and all cancerous tissue removed from them. In this manner the hemorrhage and discharge is at once checked, and the patient allowed to recuperate and regain comparative health, until after a few weeks or months the granulations sprout out again and the operation has to be repeated, again and again, until finally the patient succumbs to the constitutional effects of the disease. But her life has been prolonged by the curettings, and this is all that could be expected. I have repeatedly seen the raw, scraped surface cicatrize over and the hemorrhage cease entirely, the neoplasm continuing to grow into the parametrium and finally killing by cachexia.

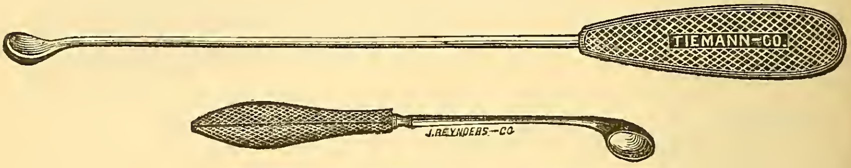


FIG. 203.—Simon's sharp curette, with stiff shank.

It is, however, not advisable to curette every case of cancer of the cervix in which there may be malignant granulations at the external os. *If they do not bleed, let them alone*, for in such cases I believe that too early interference seems to stimulate the neoplasm to more rapid growth. You cannot cure the patient in any case; therefore do not operate on her unless there is a decided indication and a reason for haste.

Occasionally, it may be necessary to remove more than the superficial cancerous granulations from a funnel-shaped cervix with the curette. A whole enlarged epitheliomatous cervix, a cauliflower growth, may need to be rapidly removed, and no other instrument is at hand, or the galvanic cautery battery does not work (each of which occurrences happened to me once) ; in the largest sharp curette we then have a very efficient instrument for the removal of even so large a cervix. The epitheliomatous proliferations are soft and spongy, and readily yield to determined and vigorous strokes with the instrument.

The sharp curette has also been used to remove the whole or remnants of placenta from the uterine cavity after abortion. Boeters, of Berlin, has thus recommended and employed it, and I myself did so in two cases before Boeters. But this was before I had the large dull curette, which I should unhesitatingly prefer.

Method.—The curette may be used under guidance of the finger only, or what is better, through a Sims' or Simon's speculum, which enables us to apply a caustic or tampon after the operation is completed. The larger spoons are first used to remove all loose superficial tissue, and when the surface is smooth the smaller sizes are employed to scrape out the various crevices in the growth, and to clear the cervical canal as high as the internal os or higher, if the disease has spread so far. The scraping is done with some force, and we can tell when the fibrous substratum has been reached by the hard, grating feel conveyed through the instrument. The soft, cellular, cancer masses are easily removed and gouged out, sometimes leaving quite a socket behind them.

The hemorrhage during the operation is ordinarily slight, although for the moment it may appear profuse, and ceases as soon as the vagina is mopped out. The curette, in fact, arrests the hemorrhage by removing its source, the vascular granulations. The point is to operate rapidly, vigorously, and thoroughly, and but little blood will be lost. Simon used only cold water injections after the operation, but I have been in the habit of applying either an astringent, like saturated solution of alum or resin in alcohol, or more generally a caustic to the raw surface. I prefer the chloride of zinc, one to five, cotton pledgets being soaked in the solution, squeezed dry, and placed in the excavated cavity, to be left there for three or four days until they come away voluntarily. The saturated solution of chromic acid, or persulphate of iron and glycerine, may also be used. The details of these applications have already been described in the chapter on Applications to the Cervix. It is obvious that the escharotic effect of these agents will be more thorough now than before the curetting.

The pain attending this operation is generally not very great, and an anesthetic is not required, unless the peculiar sensitiveness of the patient might induce the operator to be less thorough, and hurry through the operation. In using the sharp curette in the uterine cavity, anesthesia is generally advisable. The mere act of curetting should not occupy longer than five minutes. I have frequently performed this operation in a superficial manner at the out-door clinic, but when it is to be performed thoroughly, it is always well to treat it as a serious matter, do it at the patient's home, and keep her in bed for several days after.

Dangers.—I have done this operation many times, and have seen no unpleasant reaction follow it, except in one instance. This occurred in London, where I was visiting the hospitals at the time. Dr. Alfred Wiltshire requested me to operate on a patient of his in the West London Hospital; I removed a large quantity of soft medullary tissue as far up as the internal os, and applied a tampon saturated in a weak solution of perchloride of iron. A violent peritonitis came on two days later, and on the tenth day, amid severe expulsive pains, a copious discharge of fetid fluid came away, and with it a solid, pear-shaped body, which proved to be all that was left of the uterus after the removal of the cancerous cervix. The patient recovered from the peritonitis, and a subsequent digital examination revealed entire absence of the uterus, and the vaginal roof closed by cicatricial tissue. The cancer returned in the cicatrix after a few months, and the patient died. This sloughing out of the *whole* uterus is very rare, only four other cases having been reported, so far as I know (Barker's, Mettauer's, Habit's, and Martin's).

The danger of wounding the peritoneum need not be feared, unless the tissue separating it from the seat of disease has become extraordinarily thin. This may be the case both in the cervix, when the disease has invaded the whole organ and the scoop removes almost the entire cervix, or in the uterine cavity, where the sharp scoop should always be used with great caution.

The removal of healthy uterine tissue even with the sharp scoop is scarcely to be feared, its density being ordinarily a sufficient protection against such an accident. When the tissue begins to creak under the strokes of the curette we may feel sure that sound substance has been reached, and our object should be to obtain this creaking sound all over the diseased surface, before all the cancerous tissue removable by the curette can be considered destroyed. To follow up the ramifications of the malignant cells along the lymphatics and among the stroma of the uterus by the curette (or any other means) is beyond our power, and we can, therefore, hope for none but temporary, palliative results after curetting and cauterization of the base.

IX. Local Depletion of the Uterus.

Blood may be drawn from the uterus in two ways, either by leeches applied to the cervix, or by punctures of the cervix and endometrium—scarification.

The indications for local depletion are twofold: 1, to disgorge the loaded uterine or pelvic vessels, in acute inflammation, or chronic hyperemia; and 2, to stimulate the sluggish circulation, either by unloading ectatic veins and the resultant immediate influx of a fresh stream, or by the nervous shock of the depletion.

Conditions of the first variety are: acute metritis, endometritis, and endotrachelitis. Acute ovaritis, pelvic cellulitis, and peritonitis might well indicate the local abstraction of blood, but the application of the leeches, or the performance of scarification, both being done through a speculum, entail so much disturbance to the patient that depletion by leeches and blisters to the skin of the abdomen are to be preferred.

A more common indication for local depletion is, however, the passive hyperemia of all the pelvic veins, which is almost inseparable from subinvolution and areolar hyperplasia of the uterus. The puffy, swollen appearance, and purple color of the cervix, the succulent, spheroid feel of the body of the uterus, and the sensation of weight, bearing-down, and fulness in the pelvis, are symptoms calling for an unloading of the utero-pelvic vessels. When and how often to perform this maneuvre is the question to be decided in each individual case. While in acute conditions one or two depletions (and it may be as well to say here that leeches are preferable under such circumstances) will generally suffice, in chronic, passive hyperemia—subinvolution, areolar hyperplasia, chronic endometritis, and endotrachelitis—the abstraction of blood should be repeated at intervals of once a week, more or less; in these latter conditions, scarification, while, perhaps, not quite as effectual, is greatly more convenient and, for various reasons, to be preferred.

Of the value of local depletion in acute affections of the uterus there can be no doubt; whether the object—the unloading of the blood-vessels and reduction of inflammation—cannot be as well accomplished by contracting the vessels by hot injections and abdominal applications, must be decided by the physician. If there is no counter-indication, the most rapid effect will doubtless be produced by the leeches, which may and probably should be followed by the hot remedies.

Whether local depletion, however, is so positively beneficial,—permanently beneficial, at least, in the chronic conditions afore-mentioned—is by no means so certain. The opinions are still divided as to whether it does any permanent good to abstract an ounce or two of blood every week or two from a hyperplastic uterus, whether the enlargement is in any manner reduced thereby, and the patient gradually restored. The disbelievers in the practice assert that the unloading of the blood-vessels is but momentary, and that the uterus immediately regains its former blood quantity; that resolution of the hyperplastic tissue is not shown, by experience, to be hastened by the abstraction of blood. It must be admitted that a cure will probably not be obtained in old inveterate cases of hyperplasia, by this or any other means. But experience has proved to me, as to many others who favor local bloodletting, that the unquestionable temporary relief given by the abstraction of at least two ounces of blood from the cervix continues for some days or weeks, and that this practice, frequently repeated, will not only allay many of the local and constitutional symptoms (fulness, weight, nervousness, neuralgiæ), but will assist the hot injections, iodine applications, and glycerine tampons in accomplishing after a time what reduction in size and resolution of adventitious tissue may be expected in this obstinate affection. In the absence of other more positive remedies, it is certainly proper to employ any safe measure which may possibly be beneficial.

2. The second indication, that of stimulating the pelvic circulation, obtains in amenorrhea from chronic pelvic hyperemia (also found in subinvolution and hyperplasia), and from deficient development of the uterus. In the former cases the unloading of the enlarged veins and capillaries of their sluggish contents, in the latter the shock to the pelvic vaso-motor nerves, appears to be the manner in which the depletion acts. In both classes leeches are the preferable means, but scarification will often be successful. The result of such applications, made shortly before the expected menstrual period, which may or may not appear, and is usually scanty, will in the first variety very commonly be followed by a normal flow two or three days later. In deficient development the treatment will need to be more prolonged and more frequently repeated to do good.

The peculiar circumstance, that the flow of blood from the punctures will usually cease as soon as the patient leaves the table, and that the normal menstrual discharge will come on several days later, if the operation was done at the proper time, should be remembered, and the patient cautioned not to be discouraged if she finds the flow arrested when she reaches home.

The amount of blood to be taken at each sitting will vary from one to two ounces. This is quite sufficient to produce the desired local effect, and even if repeated as often as twice a week cannot weaken the patient. To be of service in chronic cases the depletion should be practised at least once a week for several months.

Counter-indications and dangers.—If the rules given under indications be carefully observed, there are but few circumstances which would prevent local depletion. One of these is the presence of a hemophilic tendency in the patient. A woman who bleeds profusely from every needle-puncture or abrasion, should of course not be subjected to the risk of a possibly serious hemorrhage from a puncture of her uterus. The inadvisability of producing an influx of fresh blood in extensive chronic or subacute pelvic inflammation has been spoken of; we can never tell whether that influx may not rekindle the inflammation as well as refill the uterus.

A varicose vein on the cervix may be bitten by a leech or punctured, and quite profuse hemorrhage ensue. Or, the nerve-shock from the leech-bites may show itself in general erythema or urticaria, as was observed by Scanzoni, Veit, Leopold, and others; and hysterical symptoms of various kinds may also arise. Such accidents usually occur after leeching, rarely after scarification. Pregnancy must certainly be looked upon as a counter-indication; indeed, what could be the use of reducing physiological hyperemia of the uterus peculiar to that state?

When a counter-indication exists to the abstraction of blood from the cervix, or leeches seem necessary, and cannot be applied to the uterus (as in narrow, constricted vagina, in virgins, where a speculum cannot be introduced) the leeches may be placed on the labia majora, perineum, thighs, or about the anus. But it should be remembered that an opening of one of the large veins found at any of these regions may result in very severe hemorrhage.

Application of leeches.—The only manner of applying leeches to the cervix is through a cylindrical speculum. A tube of sufficient size to closely fit around the cervix should be chosen, and care taken that no fold of the vagina to which a leech might attach itself protrudes into the lumen. (The large veins in the vaginal walls render the application of leeches to them unadvisable.) When the cervix has been well fitted into the speculum, it is wiped clean and dry, and the external os plugged with a small tent of cotton inserted on a slide-applicator and cut off smoothly with scissors at the level of the surface, or by the end of a sponge tent. This is done to prevent a leech from crawling into the uterine cavity, an accident which may produce severe uterine colic, hemorrhage, and shock. If this should occur, the leech may be stupefied, by gently injecting a few drops of salt-water into the uterine cavity, and then seized with long thin dressing-forceps and withdrawn, or be left to the expulsive efforts of the uterus. While not a dangerous accident, its occurrence is unpleasant, because it delays the operation, causes annoyance to physician and patient, and may give rise to considerable pain. Obviously, the leech, living or dead, cannot be left in utero *ad indefinitum.* It must be removed before the physician takes his leave. Weber recommends passing a threaded needle through the tail of each leech before putting it into the speculum, and to guard against its escape by holding the string in the hand. The efficiency of the leeches is said not to be diminished by this practice. It certainly would be effectual in preventing their escape. The number of leeches should be counted, as they are introduced, in order that the physician may be sure of having removed all when the operation is completed. These preliminaries arranged, the leeches are put into the speculum with the fingers, and pushed up with a moist sponge on a holder or a pledget of cotton in the dressing-forceps, until they reach the cervix. The cotton is then left in the speculum in order to prevent the escape of the leeches. The mouth of the speculum should be closely watched, as a leech may very easily slip out beside the cotton, and attach himself to some other portion of the patient's body near by which happens to be exposed, or fall on the floor and, if the animal has already drawn blood, soil the carpet. As a rule, leeches bite very readily at the cervix. If they do not, a few slight punctures of the cervix will draw blood enough to attract the leeches. After a few minutes it is well to remove the cotton, and see whether the leeches have bitten. A slight pain, and a drawing, unpleasant sensation in the pelvis are all the patient feels of the bite. Generally not more than three or four leeches are applied, because these will remove all the blood required, and no more have room in the speculum. Each leech draws on an average half an ounce of blood, and two ounces are probably as much as need be taken at each sitting. Besides, the loss from after-oozing may amount to an ounce or two more.

When a leech is satisfied it loosens its hold and is removed from the speculum by depressing its mouth, and sliding the leech into a cup or bowl, together with whatever blood has escaped. Thus leech after leech is removed. Generally fifteen to twenty minutes will suffice to complete the operation, if every leech takes prompt hold. This they often fail to do, and the operation may be greatly delayed thereby. When a leech once refuses to bite, the chances are that it will not be induced to do so, and a fresh one had better be substituted.

When the leeches have all been removed, the blood is mopped out of the speculum and the cervix examined, to see whether any larger vessel has been opened, or the bleeding is profuse. If so, an alum or tannin pledget may be placed over the cervix. If slight, the speculum is withdrawn, and the patient directed to check any excessive secondary hemorrhage by astringent injections, and in case of need send for the physician. Leech-bites are often followed by more or less profuse oozing for several hours, and while this is one of the advantages of this method of depletion, it should not be allowed to continue so long as to weaken the patient. If the oozing is too slight, tepid injections should be ordered. The application of leeches should always be made at the home of the patient.

Unquestionably, the suction action of the leeches draws more blood from the uterine vessels than is obtained by mere sharp punctures. In acute inflammations, and when the hyperemia is excessive, this suction and the secondary oozing are desirable. But the question is whether in chronic hyperemia the influx of blood into the momentarily unloaded veins is not increased by the suction of the leech, and the benefit of the application counterbalanced. So much is certain, that when we want a thorough disgorgement of the blood-vessels, the leech is the proper agent. The instrument shown in Fig. 204 is intended to act a substitute for the leech. The cervix having been punctured with the lance-shaped needle, the latter is withdrawn, the suction-tube screwed down, and the piston drawn back, I do not think this contrivance has become popular. The inconvenience attending the employment of leeches, the length of time required, their expense (a matter of some importance in poor patients), and the danger of the bites bleeding too long, all these objections have led to the popularization of another method for depleting the uterus and adnexa, namely,

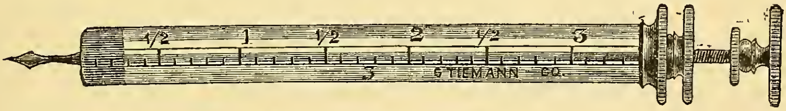


FIG. 204.—Reese's artificial leech.

Scarification.—This may be either superficial or deep. If superficial, the incisions are made with an ordinary long-handled, sharp-pointed bistoury, which is thrust into the tissue of the intravaginal portion of the cervix, to the depth of one-eighth of an inch, or with which the cervix is gashed in a radiating direction from the os, outward; five or six or more such incisions may be made. Relief of tension, splitting of occluded muciparous follicles (ovula Nabothi), and quite free bleeding, especially from the cuts near the os, result from these incisions. To gash the cervix in all directions with a dull-pointed curved knife seems to me unadvisable, because the incisions are not deep enough to draw much blood, and because the linear cicatrices resulting will after a while contract and disfigure the mucous membrane covering the cervix.

If deep incisions or punctures are desired, a fine pointed bistoury may be used, or, what is better, a regular scarificator with lance-shaped point as shown in Fig. 205. This needle is thrust into the cervical tissue, to the depth of one-fourth to one-half of an inch, and even more, care being taken to keep parallel with the cervical canal in order to avoid wounding the parametrium. As many as twenty such punctures may be made each time, not all going so deep as one-half of an inch, in proportion to the size of the cervix and the amount of blood desired and obtained. The flow of blood from scarification is by no means as great as from leech-bites. I have frequently obtained no more than one ounce from at least twenty punctures. To increase this flow, the scantiness of which depends partly upon the failure to wound larger vessels and partly upon the absence of suction-force to draw the blood down from more distant channels, various contrivances have been devised. The dry cupping-tube of Thomas, shown in Fig. 206, and Reese's artificial leech (Fig. 204) illustrate the principle of these instruments. The former is to be applied to the cervix both before and after scarification, precisely as a cupping-glass draws the blood first into the skin, and then out of the incisions which have in the interval been made in the hyperemic tissue by the cupper. Although the idea is an ingenious one, the practice has not, so far as I am aware, been generally adopted, although the instrument is figured in every work on gynecology. Injections of warm (not hot) water are almost always needed after scarification to increase and maintain the flow for a few hours at least.

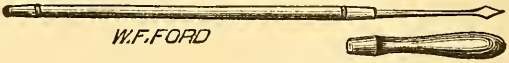


FIG. 205.—Buttles' scarificator.

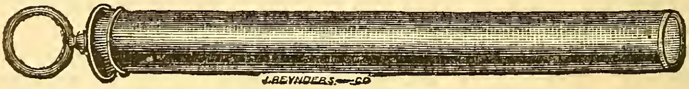


FIG. 206.—Thomas' dry cupper.

Besides the mere withdrawal of blood, scarification and puncture exerts an exceedingly favorable influence on uterine congestion by unloading the numerous little muciparous follicles which stud not only the surface of nearly every hyperplastic uterus, but often extend some distance up the cervical canal. These little glands, if at all prominent, feel to the examining finger like shot buried under the mucous membrane, and are a constant source of irritation of the cervix, and thereby of the whole uterus, constituting a variety of disease known as cystic hyperplasia of the cervix. If very large and numerous, their peculiar nodular feel may even simulate carcinoma, from which their softness chiefly distinguishes them.

On the surface they appear to the eye as small semi-opaque dots, from which on puncture a drop of viscid, glairy mucus oozes. The puncture of these follicles, which are nothing but minute retention cysts—indeed the destruction of their wall by a cutting or twisting motion of the scarificator—rapidly reduces an engorged cervix. They are particularly numerous in eversion of the endotrachelian mucous membrane from laceration of the cervix, and unless thoroughly destroyed by repeated puncture will materially interfere with union after the operation of the laceration. Even the removal of the superficial layer of the cervical mucosa covering the everted lips, as is done during the operation, does not always destroy these cysts, since the cut may simply divide them in the middle, and leave one half as a secreting surface between the lips of the wound. The glands must be obliterated by a thorough destruction of their walls, and carbolic acid, iodized phenol, or even solid nitrate of silver may be needed to accomplish this. Better a cicatrix, which can be entirely removed, than a hidden secreting surface. The puncture of these follicles may have to be repeated several times a week until all are destroyed.

Scarification of the mucous membrane of the uterine cavity proper is not quite so innocuous as that of the cervix, but it may be unavoidable when puncture of the cervix does not abstract sufficient blood. It is performed with a long hollow sound-shaped tube, from the side of the distal end of which a fine blade is protruded by a screw in the handle when the instrument is in the uterine cavity. By turning the blade about from side to side, the mucous membrane is gently incised as much as appears necessary. In obstinate amenorrhea, chiefly with hyperplastic uterus, this intra-uterine scarification may be required and prove very useful. In place of the knife, I have successfully employed the steel tampon-screw shown in Fig. 126, gently twisting the screw about in the uterine cavity, and thereby lacerating the blood-vessels. Of course care must be taken not to bore the point of the screw into the wall of the organ.

Scarification may be practised through any form of speculum, but the tubular is preferable as it permits the more neat and convenient removal of the blood, which is allowed to flow or is mopped into a cup held under the mouth of the speculum. Unlike leeching, scarification may be safely and conveniently practised at the office or outdoor clinic. It is not especially painful, although patients almost always feel every puncture, and some complain decidedly. But the operation is so short, and involves so little other trouble that they never object to this trifling pain. When I scarify at my office I usually insert a pledget of glycerine in order to prevent the blood from escaping and soiling the linen, and also to induce a watery discharge, and tell the patients to remove the cotton as soon as they return home and promote the flow by tepid injections. Constant mopping of the cervix and removal of the blood from the speculum will aid the flow, but I generally find that very little escapes when the speculum is removed. It is well to tell the patients afterward that blood has been drawn, that they have been cupped, or the blood which might show itself during the day will alarm them.

The good effects of scarification in promoting a scanty menstrual flow often do not appear until several days later, the momentary discharge having entirely ceased in the meanwhile. Warm injections, foot-baths and sitz-baths are indicated in these particular cases until the regular flow appears. The injections should not be of *hot* water, which would contract the capillaries. No evil results have, to my knowledge, ever ensued from scarification properly performed.

X. Injection of Medicinal Substances into the Tissue of the Cervix and Vagina.

Impressed with the idea that the injection of a few drops of alterative and stimulant agents into the tissue of the cervix itself might prove as beneficial in chronic hyperplasia of the cervix and body of the uterus as it does in chronic hypertrophy of the tonsils, I had a long hypodermic needle made some two years and a half ago, and began to experiment on a few appropriate patients in my outdoor clinic. I happened to have a few very intractable cases of general areolar hyperplasia, as indeed is generally the case, and I determined to see whether the patients would endure and be benefited by injecting tincture of iodine or fluid extract of ergot, which seemed to me the most suitable drugs, deep into the tissue of the cervix. Accordingly, at alternate visits of one week apart, I injected five drops of iodine and five drops of a hypodermic solution of ergot (one grain of Squibb's solid aqueous extract of ergot to two minims of water) deep into the cervix, plunging the needle at least one-half inch deep into the tissue straight upward toward the internal os, and slowly expressing the fluid. The injections were made in the outdoor clinic, and but little pain was complained of at the time. The patients were allowed to return home a short time after the injection. Soon after I began the practice, I chanced to speak of the plan to Dr. Wm. T. Lusk, and was informed by him that the same idea had been carried out some years before in Bellevue Hospital by one of the internes, and that the result had been a post-mortem for peritonitis. I still persisted, however, until I had given three injections of iodine and ergot alternately to each of four patients, when one injection of iodine produced such violent pain and para-uterine tenderness that I became alarmed, not wishing to meet with the same results as the Bellevue gentleman. The patient recovered under rest in bed and hot fomentations, but I decided to defer my experiments with this method, and have not since recommenced them. In no case was there any improvement in size of uterus or symptoms noticeable.

While I was making this trial, and anticipated from its painlessness that good results might be achieved, Dr. J. M. Bennett, of Liverpool, reported an almost identical method in chronic cervical metritis. He used a solution composed of grs. xx., each of iodide and bromide of potash, one-half drachm tincture of iodine, two drachms of water and glycerine, and injected a few drops in five or six different spots, according to the size of the cervix. Scarification of the cervix preceded the injection. No reaction was observed in any case. Three operations were generally sufficient, and he effected many cures by this method. As soon as the immediate effect of the injection had passed away the cervix was dilated by a sponge tent.

Dr. L. J. Collins, of Guilford, Indiana, has also recommended the same treatment, using a solution of ergot, 2½ grains to the injection, a pledget of cotton soaked in chloroform having first been placed to the cervix as an anesthetic. He reports excellent results, making the injections every five or six days, for two to three months. The patients were kept in bed for twenty-four hours after. No unpleasant reaction ensued in any case.

Dr. Delore, of Paris, reported sixty-three cases in 1877 of ergotine injections into the uterine tissue; the solution used was of a strength of 1 : 2. The patients were frequently seized with nausea, chills, vomiting, and pain in the head, back, and abdomen, which lasted from four to twenty-four hours. Twice an abscess occurred in the cervix, once a pelvic cellulitis. The results were certainly not as satisfactory as those obtained by hypodermic injections of the same drug ; still, hemorrhage was soon arrested, tumors ceased to grow, and the general health of the patients improved.

Encouraged by these reports I have been endeavoring to make up my mind to resume the injections. The only difficulty against practising them in an outdoor clinic is that I deem it absolutely essential to safety that the patient should remain in bed for at least twenty-four hours afterward. If positive benefit both as regards the symptoms and the diminution in size of a subinvoluted or hyperplastic uterus could be hoped for from these injections, they certainly should be given a fair trial, since so little real good can be done these cases by the means hitherto at our disposal.

Injections into the substance of the vaginal wall for malignant disease and for the deposits of chronic pelvic cellulitis have been made by Dr. Wm. M. Chamberlain, of New York. He uses an alcoholic solution of bromine (1 : 5), injecting five drops into the neoplasm every two or three days, and reports decided shrinkage of the tumor. I am not aware that this practice has been followed by other operators, nor whether its success entitles it to commendation.

A solution of chloride of zinc (1 : 5) may be injected into the parenchyma of a cancerous cervix for the purpose of producing sloughing of a portion of the growth. Five to ten drops may be injected one-fourth to one-half an inch deep. This should be done at the home of the patient and precautions taken against possible hemorrhage from arrosion of a vessel during separation of the slough. Such an accident happened to me on one occasion, and the patient lost considerable blood before I reached her and tamponed the vagina. Pure carbolic acid may be injected for a like purpose, and in the same manner; this agent acts besides as a local anesthetic. An arrosion of a vessel is not to be feared from the sloughing after the carbolic acid injection.

The injection of escharotics into a fibroid tumor is not advisable; the danger of septicemia by far outweighs any advantage in shrinkage of the tumor which might possibly ensue.

XI. Reposition of the Displaced Uterus and Ovaries.

As a rule, every displaced uterus should be replaced whenever its dislocation gives rise to symptoms, or a supporter is to be introduced to maintain it in its normal position.

The replacement of an anteverted or anteflexed uterus is an easy matter, but as soon as the support of the replacing finger is withdrawn the fundus at once falls forward again through its weight and normal inclination in that direction. A complete, and so long as the patient retains the dorsal position, permanent replacement can be obtained only by retroverting the uterus by manual or instrumental measures.

In lateral displacements the reposition is rarely possible except by force, for the reason that these dislocations are generally due to inflammatory contraction of the broad ligament of the side toward which the fundus inclines. Only by gradually stretching this adhesion can a restoration to the median line be effected.

In retro-displacements the fundus can be restored with more or less facility, unless it is bound down by intraperitoneal adhesions. In this class of dislocations the uterus once replaced, of course, assumes the normal, slightly antecurved position (see Fig. 26) and will then retain this position so long as the patient does not rise; in rare instances when the displacement was the result of recent physical shock, the retention may be permanent. Usually, the fundus falls back again as soon as the erect posture is assumed and the abdominal viscera press down on the uterus. In downward displacement, prolapsus, the replacement is also an easy matter, as soon as intra-abdominal pressure is suspended in the dorsal or knee-chest position.

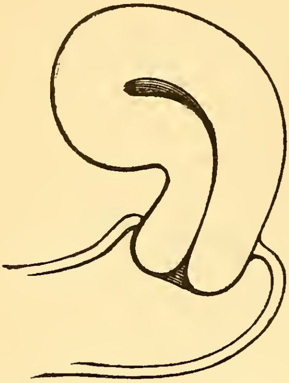


Fig. 207.—Anteflexion of uterus, first degree. (P. F. M.)

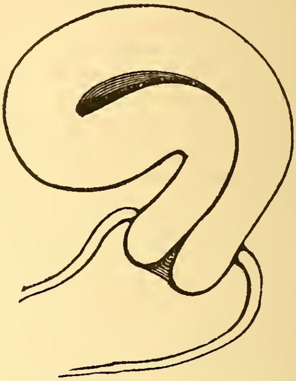


Fig. 208.—Anteflexion of uterus, second degree. (P. F. M.)

The reduction of an inverted uterus can scarcely be considered to belong under "*Minor* Surgical Gynecology," as it is generally a difficult, severe, and protracted operation. I include it here for the sake of completeness, without intending to give the minute details of all the methods now employed for the purpose.

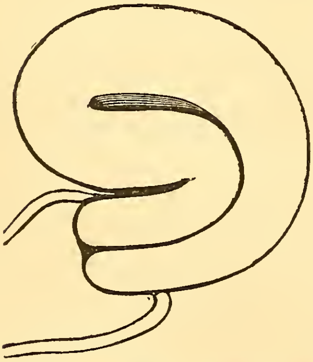


Fig. 209.—Anteflexion of uterus, third degree. (P. F. M.)

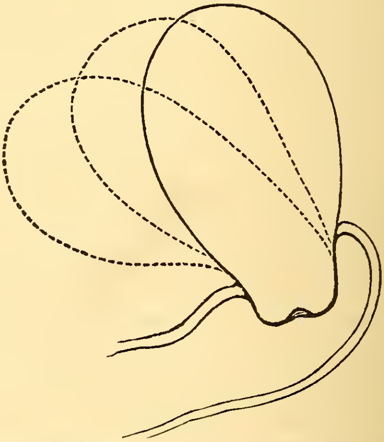


Fig. 210.—Degrees of anteversion of uterus, first and second. The solid outline is the normal position. (P. F. M.)

A displaced uterus can be restored to its normal position either by the aid of the fingers, or by gravitation and atmospheric pressure, or by instruments.

By the Fingers.

Ante-displacements.—To replace an anteverted or anteflexed uterus, it is but necessary to put the patient in the dorsal recumbent position with elevated thighs, pass the index finger into the anterior pouch of the vagina and gently press the fundus upward and backward until the external hand can be pressed into the abdominal wall between symphysis and uterus, and aid the retroposition. As soon as the fundus is steadied by the external hand, the internal finger slips behind the cervix and lifts it upward toward the symphysis, thereby carrying the fundus into retroversion. This replacement is, of course, merely temporary, unless maintained by a pessary or the prolonged dorsal decubitus. If the fundus should be bound down by adhesions to the bladder, as occasionally occurs, the replacement will not succeed. In anteflexion, also, a straightening of the uterine axis will be achieved by digital efforts only when the distortion is recent and in a flabby uterus. In congenital or chronic anteflexion, in which the uterine tissue at the angle of flexion has become cicatricial or hypertrophic, a replacement will usually be possible only by the aid of instruments. The external hand affords most valuable assistance in lifting up and steadying the fundus.

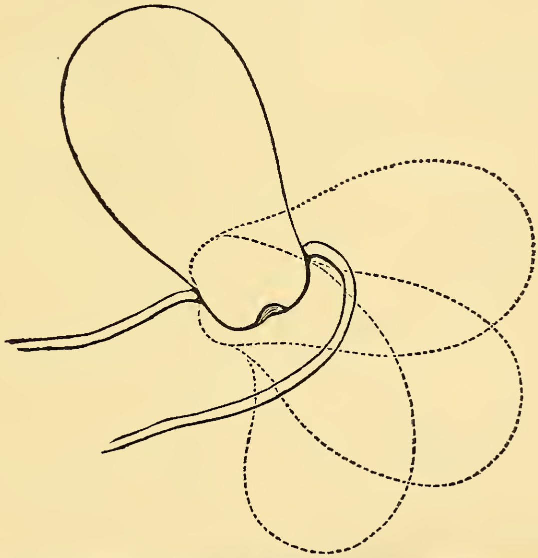


FIG. 211.—Degrees of retroversion of uterus, first, second, and third. The solid outline is the normal position. (P. F. M.)

Anterior displacements, in my opinion, are neither so productive of distress nor so curable by treatment as the backward dislocations.

Lateral displacements can be rectified also by the vaginal finger and external hand, provided the adhesions to which these displacements are due are not too firm. Unfortunately this is generally the case, and the uterus may be restored to its normal position only to snap back to its displacement when the pressure or traction is removed.

Retro-displacements are by far the most common of the deviations of the uterus requiring rectification. The displacement may be restored either on the back, side, or in the knee-breast position.

When the patient lies flat on her back, the retroverted or retroflexed fundus can be lifted up by the middle finger, while at the same moment the index pushes the cervix back toward the sacral excavation. As soon as the fundus rises to the level of the promontory of the sacrum the extertern al hand seizes it and draws it forward, the internal finger keeping up its backward pressure on the cervix. This maneuvre will usually succeed if the uterus is not too heavy, too sharply retro-displaced, especially retroflexed, and if the cervix projects sufficiently into the vagina to afford a handle for the replacing finger. In a uterus with a short intravaginal portion of the cervix the long lever (body and fundus) so far exceeds the short lever (cervix) as to render a replacement on the back almost impossible by digital efforts. Such cases also afford but little chance for retention by a pessary.

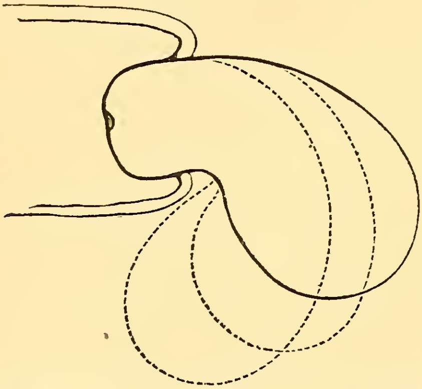


FIG. 212.—Degrees of retroflexion of uterus; first, second, and third; the solid outline is the first degree. (P. F. M.)

When a retro-displaced uterus is not easily replaceable in the dorsal position, and this very often occurs, the best method is to place the patient in the left semiprone decubitus, in which a moderate amount of gravitation away from the pelvis is obtained and intra-abdominal pressure is somewhat diminished. The clothes should be loosened about the waist. The operator then stands behind the patient, facing her head, introduces the index and middle fingers of his right hand into the vagina and carries them, with the palmar surface backward, behind the cervix into the posterior vaginal pouch. He now pushes up the displaced fundus gently but firmly, following up each advantage steadily, but using no active force, and always keeping the fingers pressed against the posterior wall of the uterus. This upward pressure may be made at intervals, or continuously; and occasionally a few quick pushes may be added in the hope of bounding the fundus above the promontory. The pain experienced during this maneuvre may be trivial, or quite severe if the uterine body is congested and tender. Besides, the pressure against the perineum, which is forced up to the utmost by the operator's fingers, causes some pain both to the latter and the patient. When the fundus has been so far elevated as to be on a level with the promontory, and requires but a slight impulse forward to accomplish the replacement, the index finger quickly seizes the anterior aspect of the cervix, while the middle finger still supports the fundus, and gently but firmly draws it backward; while this is being done the middle finger also seizes the cervix, and both together force that part as far as possible into the sacral excavation. The fundus being thus propelled forward often falls with a jerk, as it were, into anteversion. Especially does this occur if the organ is heavy and the ligaments lax. Often it is impossible to replace the uterus in this way, the fundus being adherent, or the broad ligaments thickened, or the cervix short. The uterus will then remain retro-curved, or straight, and must be entirely anteverted in the knee-chest position, or by pressure through the rectum, or by instruments.

If sufficient purchase is not obtainable on the fundus through the vagina, the two fingers of the right hand may be introduced into the rectum and pressure exerted on the fundus from that passage; or, what may perhaps be more convenient now, the operator stands directly at the feet of the patient and inserts the first two fingers of his left hand into the rectum, the palmar surface of which now presses against the anterior wall of that canal and exerts a well directed and systematic pressure on the fundus. The thumb of the same hand meanwhile enters the vagina and draws the cervix backward.

A fundus which cannot be replaced by either of these maneuvres must be firmly incarcerated below the sacral promontory, or too tender to permit effectual pressure; or it is adherent to the anterior wall of the rectum. This often happens in old displacements, when the utero-recto-sacral ligaments have become shortened by inflammatory contraction or disease; or the uterus is sharply retroflexed and very flabby; or the body is much enlarged, as in early pregnancy; or there has been pelvic peritonitis.

If this vaginal and rectal pressure fails, the attempt may be made to replace the uterus in the knee-chest position. The two first fingers are passed behind the cervix, and the fundus is alternately pressed forward and downward, and the cervix pushed backward. The elongation of the vagina in this position somewhat interferes with this maneuvre, and a sponge on a long holder, or a vaginal depressor, may be employed to push up the fundus in place of the fingers. The most powerful replacing force is exerted by the fingers or sponge-probang in the rectum, the thumb if possible drawing back the cervix. A uterus which resists this pressure will probably require the most forcible instrumental measures for its replacement.

I have generally been able to replace a retroversion or retroflexion by the fingers, per vaginam or rectum, in the semiprone position, as above described. Some operators prefer the knee-breast position for all cases; and no doubt the assistance of gravitation, to which may be added that of atmospheric pressure when the vagina is opened, is of great advantage in effecting reduction. When the fundus is too firmly impacted or too tender for replacement on the side, I always employ the knee-breast position and atmospheric pressure before resorting to further manual efforts.

The frequent replacement of a dislocated uterus, is in itself a valuable method of gradual cure by restoring tone to the ligaments, and giving the vagina the proper shape for a supporter.

A prolapsed uterus is easily replaced by putting the patient in the dorsal recumbent position, and pressing up the organ with one or more fingers, if it be descensus of the first or second degree (not beyond the vulva), and with the whole hand or both hands, if of the third degree (complete prolapsus). If the whole uterus is outside of the vulva, the vaginal walls being inverted with it, the procedure is as follows: The prolapsed mass is well oiled or greased, and the lower portion of the cone grasped in the tips of all the fingers of one hand, and gently and gradually pressed upward until the cervix is within the vulva and the whole vagina has been reinverted. If the organ is very turgid, it should be grasped in the whole of both hands and gently compressed, so as to squeeze the blood out of it, before attempting to return it. Or cold water applications may be made to it until it shrinks and its surface wrinkles. A uterus which in its prolapsed condition measures five or six inches in length will, on replacement, be found to have contracted to three or four inches; this phenomenon is due to a peculiar (histologically, as yet unexplained) putty-like ductility of the cervix. Frequently the uterus, when replaced, is found to be retroflexed below the promontory, retroversion being the natural precursor and companion of prolapsus.

Should a prolapsed uterus resist replacement in the dorsal position, the knee-chest posture should at once be assumed, and the effort repeated, when no doubt it will be successful. I have met with no case in which I found it necessary to use more than the simple means related.

I shall describe the replacement of an inverted uterus by manual and instrumental measures in the same section later on.

By Gravitation and Atmospheric Pressure.

A displaced uterus, if movable and not fixed by adhesions, may, under favorable circumstances, be entirely replaced by gravitation and atmospheric pressure without the aid of manual efforts. This applies both to ante- and retro-displacements, and to the two first degrees of prolapsus.

If we wish to replace an anteverted or anteflexed uterus by these means, it will be necessary for us to put the patient in a position in which gravitation will take place away from the pelvis toward the diaphragm, and intra-abdominal pressure toward the pelvis will be decreased. This is obtained by elevating the patient's hips and leaving her head and shoulders on the couch; in proportion to the elevation of the hips will the effect be increased. Dr. Verrier, of France, has recently reported a contrivance of his for the systematic replacement of ante-displaced uteri by gravitation and posture, which consists of two rope ladders, upon the rounds of which the patient places her feet, ascending, until the proper elevation for relaxation of the abdominal wall is found, while her trunk occupies a recumbent position on the floor. The hips are supported by a cushion. In this position the intestines glide in front of the uterus and the anteversion is replaced. By exercising the pelveo-abdominal muscles through lifting herself up by a pair of elastic hand pulleys, also attached to the ceiling, the circulation is stimulated. Daily sittings will ultimately result in permanent replacement, the author says.

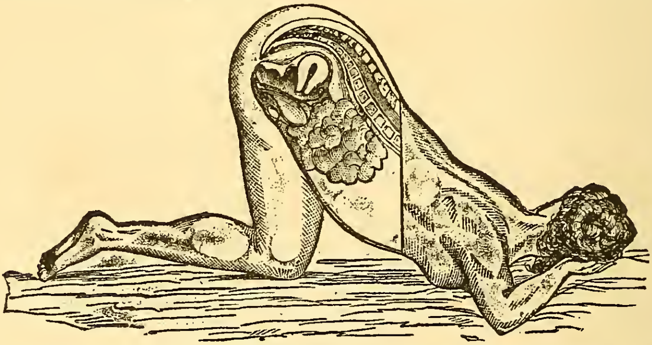


Fig. 213.—Knee-chest position, showing displacement of uterus and intestines; vagina closed. (Campbell.)

With us it is not found necessary to resort to posture to replace an anteverted uterus. The knee-breast posture certainly would not answer, as it would only aggravate the anteversion. The genu-pectoral position is chiefly employed for the replacement of a retroverted uterus, and its development into a systematic method, with the assistance of pneumatic intra-vaginal pressure, is due mainly to the efforts of Dr. Henry F. Campbell, of Augusta, Ga. Others independently hit upon the same principle, as Solger, of Berlin, and myself (who accidentally replaced a retroverted gravid uterus, which had resisted all the methods above mentioned, by elevating the perineum with Sims' speculum in the knee-chest position, and thus expanding the vagina with air), but to Campbell is due the credit of having thoroughly worked up the subject. His explanation of the method of replacement is illustrated by Figs. 213 and 214 taken from his article. In Fig. 213 the uterus is retroverted, and the intestines crowded down into the pelvic cavity, leaving a free space between the upper border of the intestines and the diaphragm. This vacuum is, of course, imaginary and exists only momentarily while the instantaneous change represented in Fig. 214 takes place. Here we see the intestines all prolapsed toward the diaphragm, the vagina dilated (I have added a Sims speculum to show the elevation of the perineum) and the uterus replaced, that is, anteverted. The forces which achieved this result are 1, suspension of intra-abdominal pressure, and consequent traction on the pelvic viscera, *vis a fronte*, and 2, intravaginal atmospheric pressure, *vis a tergo*. The former action is a suction force on the pelvic organs, which is compensated for by the rush of air into the vagina. The position alone might effect the replacement, but it is materially aided by the air-pressure, which acts in the same manner as the fingers in lifting up the fundus.

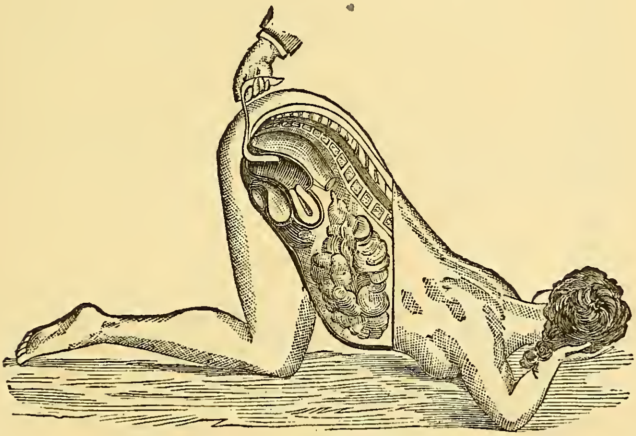


FIG. 214.—Replacement of retroverted uterus in knee-chest position and by air-pressure. (Campbell.)

That all retro-displacements can be replaced in this manner, as Campbell claims, has certainly not been my experience. I have found numerous instances in which the fundus remained wedged into the sacral excavation, no matter how forcibly the perineum was elevated and the vagina expanded. The slight impulse given to the fundus by the finger or depressor, however, sufficed to dislodge it and to bring the two natural forces into play. Or the fundus might be dislodged by seizing the cervix with a tenaculum and carrying it backward toward the sacrum. This manipulation of the cervix also answers a good purpose in the lateral position, when the fingers do not readily succeed in elevating the fundus.

Dr. Campbell recommends the frequent employment of the genu-pectoral position and air-pressure by the patients themselves at their homes, and obtains the admission of air into the vagina by teaching the patients how to separate the labia with the fingers when they have assumed the position, or by means of a small tube, like a leech or test-tube, open at both ends, which the patient inserts into her vagina. After remaining in this position for some minutes the patient turns on her side and remains in the latero-abdominal position for some time, a few hours or longer. In order to prolong the replacement of the uterus and relaxation of the pelvic ligaments as much as possible, Campbell advises that this method should be practised every evening on retiring, the patient remaining in the side position during the remainder of the night. In this way, he claims, the ligaments gradually regain their tone, and in course of time a cure may be obtained. The facility of this practice recommends it very highly. I have been in the habit for several years of directing my patients with retro-displacements to assume the genu-pectoral position and separate the labia several times a day, and have certainly heard good reports as regards relief from backache and bearing down from it. The fitting of a pessary is also facilitated by this frequent reposition of the uterus and expansion of the vagina; and a slightly displaced pessary may be spontaneously replaced, and the pressure on the posterior wall of the uterus and the retro-uterine tissues by the pessary relieved by daily employment of the same method.

By Instruments.

When a displaced uterus cannot be lifted up and straightened by the measures above described, the replacement may, if it be imperative, be accomplished by means of instruments.

It should be distinctly understood, however, that the difficulty is probably due to adhesions, and that such a replacement, after the ordinary means fail, is justifiable only by the severity of the symptoms, and should be looked upon as an operation. This holds good for those cases in which the fundus is unquestionably adherent, and in which a rekindling of the affection which caused the adhesions, viz., a pelvic peritonitis, is greatly to be feared. But there are numerous cases where the uterus is so much flexed, or so heavy, or so flabby (chiefly retroflexion and retroversion), or where it is desired to carry it into the opposite displacement, that the fingers and position alone are unable to accomplish the reposition. Here, adhesions and other counter-indications to the use of intra-uterine instruments being absent, the replacement by means of a sound or instrument specially constructed for the purpose, is no very serious matter, if gently and carefully performed.

The uterus can be replaced by gently passing the sound in the direction of the curve of the uterine canal (in ante-displacement with concavity forward, in retro-displacement with concavity backward (see Figs. 87 and 88), up to the fundus, and then very gently rotating the sound until its concavity points in the opposite direction. In this movement the rotation should be chiefly with the handle of the sound, the point is merely turned on its own axis, describing but a very slight curve and thus exerting almost no force on the endometrium. The curve of the uterine canal has now been reversed (see Fig. 216), but the uterus itself is not entirely replaced. This is done by depressing the handle of the sound gently until it touches the perineum, in retroversion, and by elevating it to the symphysis in anteversion. The fundus will then always be carried in precisely the opposite direction from the handle.

Frequently this maneuvre is less painful and difficult than the manual reposition of a tender, congested, retroverted, or sharply retroflexed uterus. If gently done, it need give no, or but little, pain, and produce no reaction, perhaps merely the discharge of a few drops of blood.

I have frequently employed the ordinary Simpson sound, and have never met with the slightest evil result. But, when the uterine canal is sufficiently patent, I should certainly advise a sound with a larger bulb at the tip, such as Peaslee's (Fig. 78); or a sound with a circular plate at about two and one-fourth inches from the tip might be used, upon which plate the cervix rests and prevents the point from touching the fundus. An injury to the fundus can be produced only by gross violence or in a diseased uterus.

The force used in this maneuvre is gauged entirely by the touch of the operator, and upon his skill and caution depends the avoidance of injury. In order to prevent this variable force, special instruments for reposition have been contrived, which replace the uterus either by gradual action through a screw-mechanism, or rapidly by a hinge-process. An instrument of the former variety is that of Elliot (Fig. 215), which is introduced curved and straightened by the screw in the handle, if it is desired to merely straighten a flexion, or introduced straight and then curved in the respective direction, if an anteversion is to be converted into a retroversion, or the reverse.

A very ingenious sound and repositor is that of Jennison, shown in Fig. 216. It is made of steel spirals so jointed that when the lower end of the sound is pressed down the upper end turns upward in proportion, and *vice versa*. It can thus be made to enter a flexed uterus very easily, and the handle being then pressed in the opposite direction the uterus is reversed, entirely in proportion to the amount of curvature of the handle.

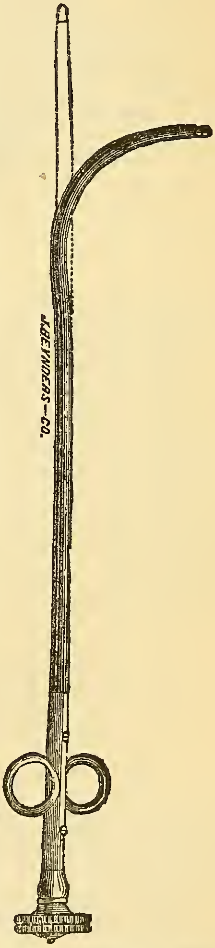


FIG. 215.—Elliot's uterine repositor.

Instruments of the second class are the repositors of Emmet and Sims, the former of which is shown in Fig. 217. The difference between them is only that the stem of Emmet's is jointed so as admit of its easy passage through a flexed canal, while that of Sims is in one straight piece. The stem is so attached by a hinge to the shank of the instrument, that when the point is near the fundus, as shown by the broad plate touching the cervix, by a rotation of the stem within the uterus and the pushing of the instrument into the anterior or posterior vaginal pouch (anterior, if an anteflexed uterus is to be retroflexed; posterior, if a retroflexed uterus is to be anteflexed) the fundus will be raised and carried in the opposite direction. It is necessary to turn the instrument, if Emmet's is used, in order to bring the inside of the hinges toward the direction to which the uterus is to be carried. This rotation is an objection to Emmet's repositor, because the endometrium is easily lacerated by the joints. In this respect that of Sims is preferable, but the latter is difficult to pass through a sharp flexion. I formerly used these repositors quite often, but of late years have succeeded quite as well with the thick sound in the comparatively few cases in which forcible instrumental reposition was required.

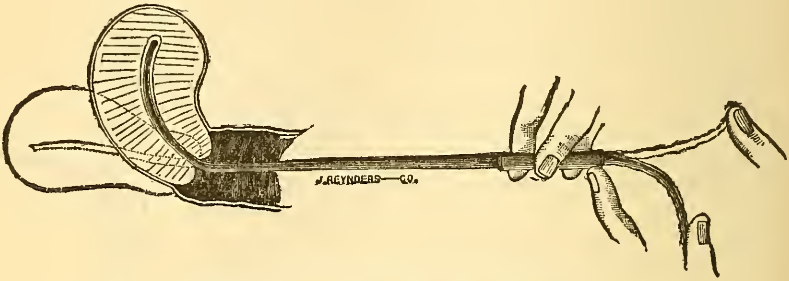


FIG. 216.—Jennison's uterine sound and repositor.

These instruments may all be used in the dorsal position without the aid of a speculum, being introduced according to the rules given for the ordinary sound, or they may be inserted in the semiprone position through a Sims speculum. If the latter, the cervix should be seized with a tenaculum, and the uterus drawn down and straightened as much as possible, before the repositor is introduced. When the replacement is about to be effected, the operator should, with his left hand, seize the speculum from the nurse, she still lifting the superior labium, and gently follow with the point of the speculum the direction given to the fundus until the position is reversed. By so doing the fixation of the uterus by the backward traction of the speculum is temporarily suspended, and undue force avoided. When the organ is replaced, the speculum is handed back to the nurse. This rule applies chiefly to retro-displacement.

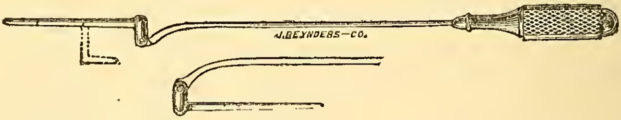


FIG. 217.—Emmet's repositor.

It will be stated in the proper place that a displaced uterus should always be restored to its normal position before a pessary is applied. This replacement should be, if possible, and in the large majority of cases can be, effected by one of the non-instrumental methods described, chiefly that with two fingers in the left latero-abdominal position, which I have found the best method. The practice of some gynecologists to elevate the uterus with the sound, and then pass the pessary over the sound into position, is decidedly reprehensible and unnecessary. A uterus should *never* be replaced by an instrument until repeated manual and postural attempts have failed. In order to ensure retention of the replaced organ until a pessary can be applied for permanent support, a position should be maintained in which gravitation favors such retention; in ante-displacement with elevated hips, in retro-displacement and prolapsus, the latero-abdominal or genu-pectoral positions.

I wish to particularly impress the axiom, that instrumental, forcible, reposition of a displaced uterus is justifiable after the non-instrumental methods fail only when the dangers possibly arising from such forcible reposition are clearly understood, and the symptoms call for interference. Such cases are chiefly those of retro-displacement; an anteverted uterus rarely becomes adherent. Under certain circumstances, when the adhesions are old and lax, and the parametrium not at all tender, and when the necessity for replacement is imperative, an attempt may be made to gently, steadily, and forcibly antevert the uterus with one of the above instruments; this is done with the distinct intention of stretching or tearing the adhesions, and therefore with the knowledge of the danger of such a practice. This is an operation, and should always be performed at the house of the patient, under anesthesia, and the patient should be kept in bed for three or four days or longer, until all chance of peritonitis has passed.

Dr. A. F. Erich, of Baltimore, has recently operated on several such cases with success, using a stout steel sound with a circumference of 36 mm. at its tip. The anterior wall of the rectum should be held back by fingers, or a thick bougie in that passage, or else it will be lifted up, and the adhesions remain untorn. A more gentle, but certainly less certain method is that of Kuechenmeister, by passing a rubber bag into the rectum and distending it with water, leaving it there as long as the patient can bear it. This is to be repeated every day until the uterus is replaced, or the rectum becomes too irritable. The exercise of force in elevating a retroverted and adherent uterus cannot be too severely deprecated. Although the replacement of such an organ is to be ardently desired, the dangers attending the operation have deterred the majority of gynecologists from attempting it. It is to be hoped that time will bring us an efficient and safe remedy for these intractable cases.

The replacement of the *prolapsed ovaries* is easily effected, unless they are adherent, by the manual and postural methods described for retroversion of the uterus. A proper retaining support should be introduced before the erect position is resumed, or the ovaries will at once glide down again.

The *replacement of an inverted uterus* may be effected by manual and instrumental methods, both acting very much in the same manner, by exerting steady and continuous pressure on the inverted fundus. The chief difficulty is to overcome the resistance offered to the re-inversion of the fundus by the firmly contracted ring of the cervix. To dilate this ring by counter-pressure from above is quite as important as the upward forcing of the fundus from the vagina. All methods therefore seek to combine these two forces.

The methods are either such as are designed to effect rapid reduction, or such as attain their object by continued and gradual force. Either may be accomplished by manual or by instrumental efforts, or by both combined.

Of the methods for rapid reduction, those of Emmet, Barrier, Noeggerath, Courty and Tate (manual), White and Byrne (instrumental), are the most practical.

Emmet's method consists in grasping the whole uterus with the hand in the vagina, and with its palm forcing the fundus up while the fingers endeavor to dilate the cervical ring; the combined fingers of the other hand meanwhile exert steady counter-pressure on the ring through the abdominal wall.

Barrier also grasps the uterus in the whole hand, and forces the cervix up against the sacrum as a point of resistance, while the thumb presses in the fundus.

Noeggerath places the index finger on one horn of the uterus, the thumb on the other, and endeavors to indent and re-invert first one corner and then the other; this having succeeded, central pressure on the re-inverted cup is made, until reduction is completed. Counter-pressure is exerted in the usual way by the outer hand. This is an excellent method, and has achieved more results, probably, than any other. Thomas reports succeeding with it in three out of five cases.

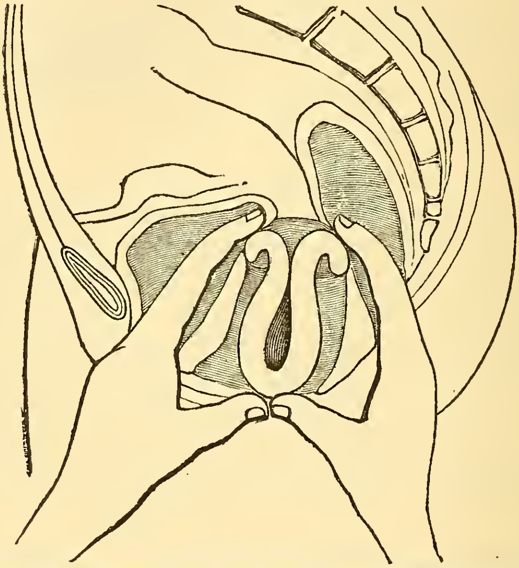


FIG. 218.—Tate's method of reduction of an inverted uterus. (P. F. M.)

Courty's method consists in passing the index and middle finger into the rectum, and hooking them through the anterior rectal wall into the cervical ring; the thumb of the same hand or the whole other hand then compresses and pushes up the fundus, while the two rectal fingers endeavor to dilate and draw down the cervical ring. The advantage this plan gives if the ring can be firmly grasped, is apparent. A modification, and in point of efficiency, doubtless, an improvement is the method of J. H. Tate, of Cincinnati, who dilated the urethra, and introduced the index finger of the left hand through the bladder into the cervical ring, and two fingers of the right hand through the rectum also into the ring, and both thumbs against the cornua of the fundus in the vagina. By now dilating the cervical ring with the fingers of both hands, while the thumbs push up the fundus, the reduction of the inversion was inevitable. I am not aware whether any one but the inventor has used this method; he succeeded with it admirably in a case of forty years' standing after but half an hour's efforts (*Cincinnati Lancet and Observer*, March, 1878), completing the reduction by pushing up the fundus with a tallow-candle wrapped in a rag. To prevent return of the inversion, the external os was closed by a silver suture, which was removed on the third day. The patient recovered without any untoward symptom.

Theoretically, this plan would seem by far the most efficient of any. The disadvantage of dilating the urethra carries but little weight, compared with the great benefit to be derived from the double fixation of the cervical ring. Besides, every patient whose inverted uterus is to be reduced is *eo ipso* put under an anesthetic; the urethral dilatation, therefore, requires no previous preparation.

White's method consists in pushing up the fundus with a hard rubber cup attached to a stem and strong spiral spring which is pressed against the thorax of the operator, the vaginal hand steadying the cup while the outer hand exercises the usual counter-pressure and dilatation of the ring.

Byrne's instrument consists of a hard-rubber cup to fit over the fundus (of which there are three sizes), the largest two and one-half inches in diameter, in which a movable plate is fixed which can be slowly propelled forward by a screw in the handle. Another similar cup with a movable cone is placed on the abdomen over the cervical ring, and the cone advanced by means of a screw until it enters the ring. By now slowly screwing forward the plate in the vaginal cup, and exerting counter-pressure with the cup and cone on the abdomen, the fundus was entirely replaced in three stages within half an hour, in a case of inversion of nine days' standing which had resisted previous efforts at replacement. Thomas reports having employed the instrument successfully in one case.

The time required to replace a uterus by these rapid methods, may vary from a few minutes to several hours, if unsuccessful sooner, until in fact the operator is exhausted, or regard for the consequences to the patient of such long continued force, and the length of the anesthesia, call for a postponement of the reduction to another day. Anesthesia is required in every case, both to relieve the unavoidable pain and to relax the tissues. The operator should have several trained assistants to relieve him when his strength gives out, as it often will; both hands should be employed alternately. The uterus should have been softened by frequent hot vaginal baths for some time before the operation. If one attempt does not succeed, the patient should be put to bed, and all precautions adopted to prevent peritonitis; and when this danger has subsided, a fresh attempt should be made, and so on until the reduction is effected, or its impossibility assured by any rapid method. Then, one of the means of gradual reduction should be employed, or if this fails, amputation may be called for. As a substitute for this last resort, Thomas has practised an operation which rationally is perfectly correct, but the boldness of which has prevented its being followed. He opened the abdominal cavity and with an instrument like a glove-stretcher dilated the cervical ring, while the other hand in the vagina pushed up the fundus. One patient recovered, the other died. In view of the recent favorable reports of ablation of the inverted uterus by the elastic ligature, completed by the knife, it seems scarcely likely that Thomas' method will find many followers.

The dangers from these manipulations are by no means inconsiderable. Peritonitis or cellulitis may follow the necessarily forcible handling of the uterus and adnexa, and these affections may terminate fatally or result in adhesions between the opposing uterine surfaces or fixation of the organ in its inverted position and consequent permanent impracticability of reduction. When the reaction following efforts at rapid reduction gives rise to fears of such results, or when all forcible methods fail, the influence of gradual pressure against the fundus should be tested. The methods by which this may be performed are: elastic pressure by vaginal stem, and cup or bulb; elastic pressure by vaginal water-bag combined with taxis, or by vaginal bag alone.

In the first method a cup (like that of White's or Byrne's repositors), or an olive-shaped bulb of hard rubber or wood, is introduced into the vagina and placed over or against the inverted fundus; the stem is attached to a broad elastic belt, which passes between the thighs and is fastened before and behind by buckles, to a firm abdominal belt. By tightening this strap the pressure may be increased at will. Or the broad **T**-band may be replaced by four strong cords of elastic tubing or solid elastic, which pass up in front and behind, and are attached to the abdominal belt at either side of the median line. Counter-pressure should be exerted by a tight roll of cotton several inches in diameter, which is placed across the hypogastrium, immediately above the symphysis and kept there by a broad strip of adhesive plaster passed entirely around the body. To prevent the uterus from slipping to one side under the steady pressure of the cup, it is well to pack the vaginal vault around the uterus with carbolized cotton, before applying the cup. The pressure of the cup or bulb should be only very gradually increased, if at all. Steady, firm, gentle pressure against the fundus will tire out the contracted uterus more effectually than too much force.

Reduction by the gradual pressure of an elastic bag in the vagina is quite as sure a method as the above. If desired, the gradual pressure may be combined with daily kneading of the uterus with the hand. But the bag alone will often suffice. After packing the vaginal pouch with carbolized glycerated cotton, the bag is introduced, and filled with water. Thomas recommends retaining the bag by a broad strip of adhesive plaster which is attached to the abdominal wall near the navel in front, and to the lumbar region behind. Two holes are cut in it for the passage of urine and the tube of the bag. The latter may be still more distended, or relaxed, as the indication occurs.

It is not necessary, nor indeed feasible, to anesthetize the patient during this trial of gradual pressure, because the pain is usually not very great if the pressure is but slight, and because the treatment lasts too long. In one case gradual pressure was exerted for eighteen days before the reduction was completed. The limit of trial of this method, therefore, depends entirely upon the endurance of the patient. It certainly is far safer than rapid reduction. Occasionally, the patient cannot endure the wearing, stretching pain of the dilated bags, or repositors, or inflammatory symptoms begin to show themselves, and then anesthesia and rapid reduction are called for.

Two other methods have been recommended, which act on a different principle from those described: that by repeated bathing of the uterus with cold water thrown forcibly into the vagina with a syringe through a speculum (one case of success is reported by Martin, of France), and that of Thomas, by encircling the uterus with a bandage of rubber sheeting. Both methods have for their object the compression and diminution in size of the uterus, and thereby its spontaneous re-inversion. In the one case in which Thomas' method was tried (a case of Dr. Robert Watts) the elastic pressure produced sloughing of the uterine mucous membrane and peritonitis, from which the patient recovered. The rubber bandage was discarded, and the case finally cured by the pressure of an elastic bag.

The number of cases of reduction of an inverted uterus by either one of the methods named has become so numerous of late years that an additional case excites no special attention. The oldest case of reduction is that of Tate, forty years; next come those of White, of Buffalo, twenty-two and fifteen years; Noeggerath, Dibardber, thirteen years; Aibie C. Tyler, eleven years; and numerous others up to within a few months of the occurrence of the accident.

Several cases of spontaneous reduction of the inversion are on record, the latest of which is that of Spiegelberg. There are nine others, those of Leroux, De la Barre, Baudelocque, Thatcher; three of Meigs; Rendu, Shaw. The mechanism of this process is explained only in Spiegelberg's case, as follows: The reduction took place during a profuse diarrhea, with straining; thereby the uterus was forced down into the pelvis, the round ligaments were put to their utmost tension, and the diarrhea continuing, the inverted fundus was drawn up, and gradually replaced by the traction of the round ligaments. This explanation certainly is plausible.

XII. PESSARIES.

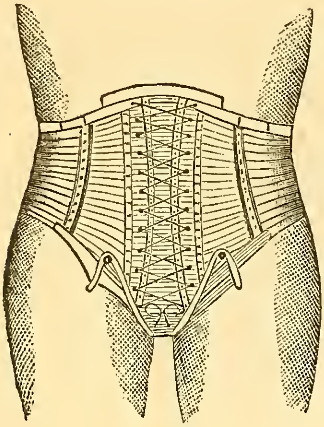
By pessaries, we mean instruments of various constructions, shapes, and materials, designed for the purpose of supporting a displaced or distorted uterus after its replacement, or of gradually effecting that replacement. They have been employed in crude shapes for many years (the Arabians used a distended animal bladder; Paré, in 1573, made the first ring-shaped instrument); but only since the invention of the lever pessary by Dr. Hugh L. Hodge, of Philadelphia, can it be said that the construction and application of vaginal pessaries has rested on scientific and properly appreciated mechanical principles.

According to the construction and manner of use of pessaries, or uterine supporters, as they are also called, they are divided into four varieties: 1, abdominal; 2, vaginal; 3, vagino-abdominal; 4, intra-uterine.

1. *Abdominal Supporters.*

Abdominal bandages, corsets, supporters, are used either to sustain the relaxed, flabby, pendulous abdominal walls; or to support abdominal tumors or the pregnant uterus; or to compress the abdominal walls after removal of a large mass from the peritoneal cavity, as after labor, ovariotomy, tapping for ascites; or to lift up the fundus of an ante-displaced uterus.

According to the indication, a different form of supporter is required. If it is desired merely to support the abdominal walls by a uniform pressure exerted over the whole surface and directed chiefly upward, bandages which enclose the whole abdomen are the most serviceable. Such are the supporters shown in Figs. 219 to 223. They are either composed of silk, or elastic bandages sewed together, and closed by lacework behind, or of silk or jean with whalebone rods at intervals to insure stiffness, and composed of several sections loosely united, the whole fastened by a strap or laces. Or the thoracic corset is made to extend down over the abdomen to the pubes, being stiffened by whalebones. Or the bandage shown in Figs. 219 and 220, and devised by Pinard, of Paris, to retain the fetus in its rectified position after external version, will be found serviceable in abdominal tumors. One of the objections to all these abdominal bandages is that they are liable to slip up and wrinkle, unless held down to the hips and pubes by bands passed between the thighs. These bands are either made of leather, or cloth, or, still better, of rubber-tubing attached before and behind by looped cords. Most patients object decidedly to the friction and pressure of these cords, and it always takes several days for them to become used to them. · If it is preferred, a broad single central band may be substituted for these two lateral bands. This is particularly useful if it is desired to exert a supporting influence over the vulva, as for the retention of prolapsus, or vaginal pessaries, or tampons, or hernia of the labium. The supporter of Noeggerath is a useful contrivance of this kind, the central pad being attached to two bands before and behind. The por-



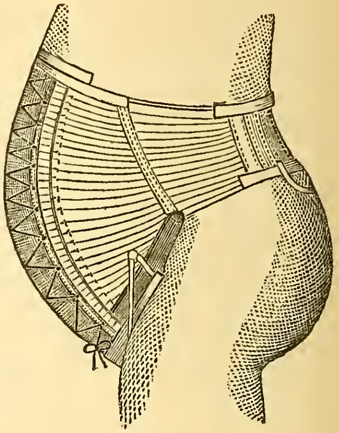


Fig. 219. Pinard's abdominal supporter. Fig. 220.

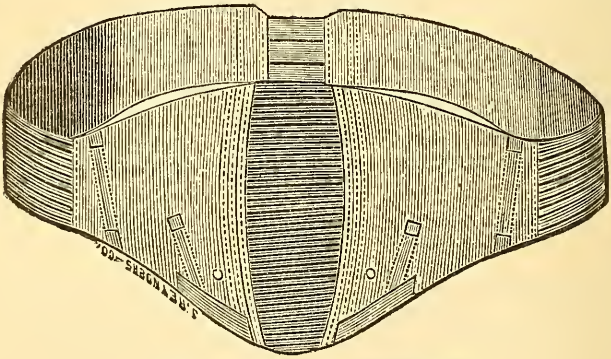

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Fig. 221.—Reynders' abdominal supporter.

tion fitting over the vulva is generally occupied by a longitudinal pad covered with oiled-silk, or rubber-cloth.

The whalebone rods usually inserted in these supporters to render them stiff are liable to press into the flesh or rub against the crest of the ilium. They are therefore often unbearable, and give so much discomfort as to be discarded, and replaced by a soft bandage with thigh-straps. A woman can very often manufacture such a bandage for herself much better, and certainly very much cheaper, than she can buy it. Strong jean, canton flannel, or unbleached muslin, can easily be shaped, with a little ingenuity, into a bandage which will fit closely to the form, if supplied with two broad elastic bands at the top and bottom, which are long enough to go entirely around the body, and buckle in front. The lower strap should be fastened more tightly than the upper, in order to press the abdomen upward. A practical home-made supporter appears to be the one shown in Fig. 222, which is described by Dr. Julia H. Smith, of Chicago; a similar contrivance is that shown in Fig. 223. The cut 222, shows the bandage in position. "It is made of cotton drilling for winter, heavy linen for summer wear; one and one-fourth yard of drilling makes one of ordinary size. A measure is taken round the body just above the pubes, and at the waist. A seam is cut on the hips and in the middle of the back to make it fit the form, and the bandage is lapped in front, over a cushion made of hair, which is placed just above the pubes to make the necessary pressure. To prevent its slipping out of place elastic tapes are fastened on the bandage, and the end pinned to the stocking, thus serving a double purpose."

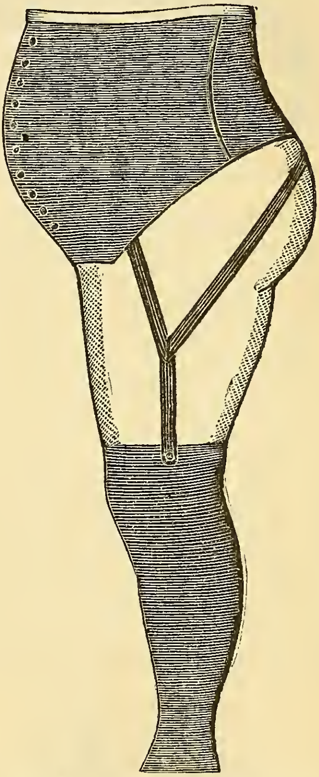

Fig. 222.—Home-made abdominal supporter.

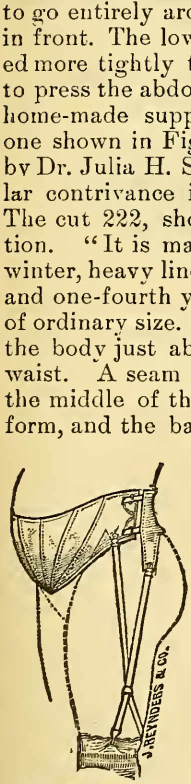
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Fig. 223. — Gray and Foster's abdominal supporter.

When it is desired to exert special pressure over the symphysis pubis in order to support or press back the fundus of an anteverted or anteflexed uterus, these uniformly compressing supporters are insufficient. An oval convex pad of cotton covered with cloth or kid leather may be attached to the inside of the bandage so as to fit immediately above the pubis; or a special pad attached to an abdominal band, or a broad steel spring may be employed, the pressure being directed only on two spots, over the pubis and the lumbar vertebræ. This spring pad is constructed on the truss principle, and is illustrated by the bandage known as the "ceinture hypogastrique."

A very good supporter for this purpose is the cedarwood pad of Thomas, which consists of an oblong piece of smooth cedarwood about six inches long, by three inches wide, by two inches thick, the abdominal surface of which is convex, so as to press deeply into the abdominal wall above the pubis.

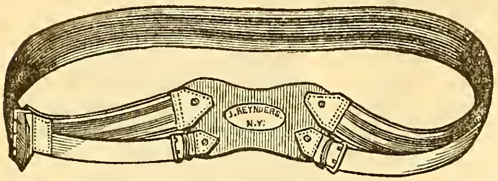

FIG. 224.—Thomas' wooden pad supporter for anteversion.

I generally employ the slightly concave hard-rubber plate of an abdomino-vaginal supporter as a suprapubic pad, having the concavity filled out by leather padding, if necessary. I have found great benefit from these supra-pubic pads in aggravated anteversion, being even able to dispense with an intra-vaginal pessary while they were worn. Thus a few years ago, while on my vacation in the country, I was asked to see a city lady who was confined to her bed by an inability to retain her urine when up. I found an anteverted, hyperplastic uterus, which no doubt rested on the bladder when the patient was up. I sent her a cedarwood pad supporter as soon as I returned to the city, and with it she was at once able to leave her bed and walk about with almost entire comfort. On my return to the country two weeks later I added a Thomas cup-pessary (see Fig. 239), and thus gave her uterus all the necessary support.

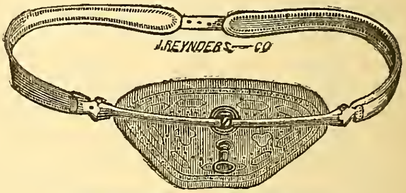

FIG. 225.—Ceinture hypogastrique.

In another instance a young lady with sharp anteflexion was entirely relieved of her suprapubic pressure and bearing-down feeling, and enabled to walk as well as in health, by means of the hard-rubber plate shown in Fig. 282. Of course this supra-pubic pressure did not straighten the flexion, which required a vaginal instrument.

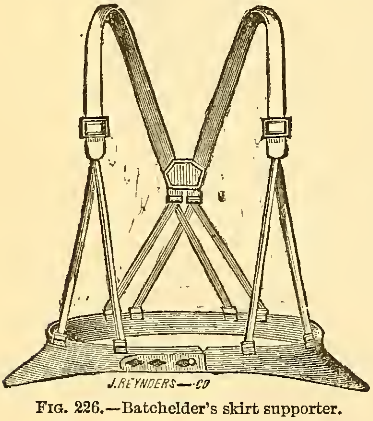

FIG. 226.—Batchelder's skirt supporter.

The abdominal pad merely supported the abdominal viscera, rendered the uterus less movable, and prevented its pressing on the bladder. Thigh-straps are always required to keep these pads in place. All the supporters and corsets which are designed to lift up and compress the whole abdominal wall should be sustained by broad bands passing over the shoulders and crossed in front and behind. Ordinary suspenders will answer for this purpose, or the abdominal supporter may be buttoned, hooked, or strapped to the thoracic corset, which it is fair to assume ninety-nine out of one hundred of all women still wear, in spite of medical protest. If the corset is provided with a circular metal border resting on the hips, so that downward pressure on the yielding abdominal wall is avoided, it can do no harm, and any weight attached to it (such as an abdominal supporter, and chiefly the skirts) will hang from the shoulders. A very useful contrivance is that shown in Fig. 226.

The ordinary **T**-bandage is useful in the same cases as Noeggerath's apparatus, above described, and is chiefly employed to apply a napkin to the vulva during menstruation or a vaginal leucorrhea, or to prevent medicinal agents from soiling the clothes, or tampons or pessaries from escaping. Every woman can make one for herself of cotton or linen covered with oiled silk. The genital piece is attached to the waistband in front and behind, or the bandage may be in one piece.

The manner of enveloping the abdomen with broad binders, as after labor and laparotomy, does not properly belong in this work.

2. *Vaginal Supporters.*

Pessaries which are contained entirely within the vagina are so variable in construction, in accordance with the peculiar features and necessities of each case and the practice, ideas, and hobbies of the physician, that their number is legion, and it will be absolutely impossible for me to enumerate and describe them all. Besides, it would be entirely unnecessary to do so, since the vast majority are either mere trifling modifications of some main type, to each of which the ambitious inventor or the obliging instrument-maker has given the former's name, or they are mere freaks of fancy—theoretical experiments—which have never extended beyond the inventor's practice or the instrument-maker's shop. I shall endeavor to describe all the varieties of pessaries for each displacement of the uterus which have become deservedly or undeservedly popular, explain their advantages and disadvantages, their uses and abuses, so far as my experience has enabled me to judge ; and shall refer the reader for the study of the obsolete and useless instruments of this class to the instrument-makers' catalogues and the museums of our medical colleges. In no branch of mechanical art does the inventive spirit of mankind seem to have run more riot than in the production of pessaries, with the only exception, perhaps, of the obstetric forceps.

Pessaries are most frequently made of hard rubber, polished to such a degree of smoothness as not to irritate the vaginal walls; but they may be made of silver or aluminium (the lightness of the latter being an advantage), or of celluloid ; or, if a flexible instrument is desired, we have them of flexible tin, of thick copper wire covered with soft rubber, of a large watch-spring also covered with soft rubber; or of fine strands of wire laid together so as to put the end of each strand in a different place, also with soft rubber covering. Finally, for large flabby vaginæ in prolapsus we have inflatable bags of soft rubber, glass balls and rings, canvas rings covered with japan, wooden rings, etc.

The great objection to all pessaries made of inflexible material is that the shape of the instrument cannot be changed to suit the peculiarities of each case, and that therefore a large assortment of different sizes and shapes must be kept on hand to choose from. In a city with instrument-makers at hand this is a matter of little consequence, but in the country it is a serious evil which may entirely prevent the physician from relieving the class of patients for whom pessaries are needed. And even in cities, the inconvenience of having to make a new appointment with your patient until you are able to procure a better fitting pessary for her, instead of being able to shape the instrument at once to fit her case, is a matter of annoyance to both parties. The hard-rubber pessary, to be sure, that is to say the variety made of a slender ring, can be bent and moulded by being covered with sweet oil and carefully heated over a spirit-lamp, or in boiling water. But, over the lamp the inexperienced operator will probably blister the pessary and spoil it (for a pessary with a rough surface is absolutely useless and injurious); and in hot water the pessary is seldom sufficiently heated to retain its flexibility until removed and bent to the desired shape. It certainly requires a greater amount of practice and dexterity to mould these hard-rubber pessaries than the majority of practitioners possess. To furnish us with a pessary flexible at will, the copper wire covered with soft rubber was introduced, but all soft-rubber pessaries possess the great, irremediable objection of absorbing the vaginal secretions, soon becoming offensive, and of irritating the tissues by a gradually increasing roughness of surface. Soft rubber cannot, it seems, be so treated by chemicals as to be flexible, and at the same time remain unaffected by the acid vaginal secretions. Dr. F. Wilhoft, late of New Orleans, claimed to have constructed a flexible pessary covered with an indestructible rubber composition, and moulded his pessaries over a block in order to give them an even curve. So far as the shape was concerned the pessaries did very well, but the rubber covering soon became discolored and rough, as I had occasion to satisfy myself. Dr. Wm. M. Chamberlain, of New York, has made numerous laborious experiments in this direction, and has achieved as good a result as we seem likely to have. He has recently succeeded in having a copper-wire pessary made with a rubber coating, which is flexible by merely dipping it in hot water or rubbing it between the fingers, and which after being worn several months undergoes no change except a slight yellowish discoloration.

F. G. Otto & Sons, instrument-makers in New York, have quite lately perfected a series of experiments with celluloid for the manufacture of specula, syringes, catheters, and other surgical and gynecological instruments (which, *en passant* be it said, are admirable), and among other things have covered a number of copper-wire pessaries with a coating of celluloid so thin as to permit of their being bent in any shape by first merely rubbing them between the fingers. Celluloid is absolutely unaffected by any secretion, and is, indeed, touched only by alcohol and camphor, which articles it is not likely to meet with in the vagina. If the firm succeed in making somewhat thicker pessaries than they have thus far done—the invention is but in its infancy—and the article proves as durable as seems probable, a great advance will have been made in the science of pessaries, and the comprehension of their application will have been greatly facilitated.

The flexible rings of block-tin and copper, uncovered by rubber, are too easily roughened by deposits of vaginal salts on them to be of more than temporary utility as models after which hard instruments are to be constructed. Not only those pessaries which require to be modelled to suit each case, but also those which act chiefly by their bulk, should be of unchangeable material. The large rings for prolapsus uteri should, therefore, be of glass or hard rubber, in preference to canvas and soft rubber.

The *general indications* for vaginal pessaries are of course some form of uterine displacement or distortion (anteversion or anteflexion, retroversion or retroflexion, latero-flexion, prolapsus) or a prolapsus of the anterior wall of the vagina together with the posterior wall of the bladder (cystocele), or of the posterior wall of the vagina with the anterior wall of the rectum (rectocele). Finally, excessive mobility of the uterus, resulting in alternating painful pressure by the fundus on the bladder or rectum, may require a pessary merely as a means of maintaining the uterus in one position.

It is not to be understood, however, that every displacement or distortion requires a vaginal supporter; it may be so slight as to produce no symptoms whatever, or it may not distress the patient even though severe. Thus the uterus may be moderately anteverted or anteflexed, but the patient suffer neither from pressure on the bladder, nor dysmenorrhea, nor be sterile (the usual results of the higher degrees of these displacements). Or the uterus may be retroverted only in the first degree, and the patient experience no annoyance from it, or there may be a more severe backward displacement and still no symptoms. In these cases it may not be necessary to introduce a pessary, especially if the patient is advanced in years, unmarried, or beyond the child-bearing period; and the probabilities are that the usual atrophy of the uterus after the menopause will render future annoyance from the displacement still less likely. Again, the replacement of a retroverted uterus and its support by a pessary may give the patient more pain than if the case is let alone; or repeated attempts show that the uterus is too flabby to permit the pressure of a pessary, or the vagina is too short, or the posterior cul-de-sac too tender to bear the pressure always exerted by a pessary. In young girls, for instance, a moderate anteflexion or retroversion does not necessarily call for a vaginal supporter unless the symptoms actually require local interference. In ante-displacements an abdominal pad will often suffice. It does not follow that, because a young girl has a displacement of moderate degree she will thereby necessarily be unfitted for marriage and maternity. Still, I have generally followed the rule, that if a displacement of anything more than the first degree is discovered in a young woman who expects to be married soon, and who consults a physician for one of the local signs of uterine disease (backache, bearing down, dysmenorrhea), that displacement should be rectified as much as possible before she should be allowed to marry.

Treatment is much easier and more effectual then than later, when the excitements and requirements of married life fully occupy the sexual organs. No man likes to have his wife suffer from uterine disease and be subjected to local treatment, by pessaries or otherwise, almost before the honeymoon is over. And his feelings are not always free from selfishness, for his own comfort is disturbed thereby. Besides, a displacement is always more or less aggravated by the mechanical and vascular irritation of the sexual organs. Therefore, it is always best to endeavor to cure uterine disease, rectify a displacement, before marriage, even though the discomfort therefrom be but slight at the time. The chances are that marriage will arouse symptoms which have not yet appeared.

Further, many patients present themselves with displacements, chiefly backward, in whom a pessary is inadmissible because the displacement cannot be rectified; the uterus being held down by adhesions remaining from an attack of peritonitis or cellulitis. Before a pessary can be worn with benefit and comfort, these adhesions must be dispersed or stretched, and months are usually required to do this, if indeed it be possible at all. In some cases, however, this very stretching may be accomplished by the pessary itself; but such cases are the exception, and must be carefully watched lest the pressure rekindle the inflammation or produce ulceration.

In displacement of the vaginal walls—cystocele and rectocele—the amount of displacement and the discomfort experienced therefrom, will influence the necessity and choice of a pessary. If there be a loss of support for the posterior wall (whereby the anterior wall may also become displaced) through destruction of the perineum, the restoration of that part by a plastic operation is called for before a properly fitting supporter can be used with benefit. To follow the old time- (but not otherwise) honored practice of holding up the prolapsed parts by crowding a large globular or annular supporter into the vagina, which acts only by its size, is not treating the case scientifically.

In prolapsus uteri et vaginæ,when the whole mass protrudes from the vulva, a supporter is called for in the highest degree. But the difficulty is not to form an indication for a supporter in these cases, but to find the instrument which will keep up the uterus and produce neither pain nor ulceration by pressure.

Sterility due to a displacement (ante- or retro-) calls for a reposition of the organ and its retention by a pessary. When conception has taken place, the retention of the pessary is still important, because, if it were removed, the uterus might, and in consequence of its increased weight probably would, again become displaced, and the thereby induced congestion might readily bring on a miscarriage. For the same reason, if a uterus enlarged by early pregnancy is found displaced it should be restored to its normal position and retained by a pessary. This rule applies chiefly to retro-displacement. In ante-displacement the growth of the organ during pregnancy usually accomplishes the rectification by itself. Impregnation of a retro-displaced uterus is therefore a direct indication for a pessary, which should be worn until the growth of the organ has brought the fundus above the promontory of the sacrum, that is, till about the beginning of the fourth month.

Counter-indications to the use of pessaries are of course the absence of a properly formulated indication, such as already described; further acute inflammation of the uterus and adnexa, and of the vagina, and chronic inflammation of these parts when the pressure of the finger gives pain or the displacement is due to adhesions which prevent the reposition of the uterus. A profuse leucorrheal discharge may also counter-indicate a pessary for the time being, because the unavoidable irritation of every pessary produces a vaginal discharge and of course will aggravate one already existing. A cervical or intra-uterine discharge does not do so, because the chronic congestion upon which the discharge depends may be due to the displacement and will be relieved by the reposition and retention of the uterus in its normal position.

A laceration of the cervix may counter-indicate a pessary, because the fixation of the vaginal walls by the pessary tends to separate the everted lips. The question which of the two affections, the displacement or the laceration, gives the most trouble will then have to be decided; generally the displacement will carry the day.

Married life does not counter-indicate the wearing of a pessary, unless the husband absolutely objects to any foreign body in the vagina of his wife. The slender, smooth, and accurately fitted pessaries now generally used do not, as a rule, interfere with coition, if the wife be informed by her physician how to adjust the pessary for the moment in case it should chance to be in the way.

The rule is to remove, as far as possible, all counter-indications before applying a pessary, and this preparatory treatment may occupy months.

General Considerations influencing the Selection, Application, and Management of Pessaries.

There is probably no therapeutic measure in gynecological practice which is so little understood and so thoroughly mismanaged as the use of pessaries. On the ignorance of the practitioner will, in the large majority of cases, depend his want of success in fitting a pessary so that it will retain the uterus in its proper position; and of course the fault is never sought in himself, but is always attributed to the pessary. A very common error is to choose too large, too sharply bent instruments, which do too much and crowd the uterus into another position quite as distressing as the original displacement. Next to the proper selection and fitting of an instrument to each particular case, the omission to watch it and prevent its doing injury by pressure or becoming displaced, and the too long retention of the same instrument without a change or occasional removal, are the causes of the disappointment and unpleasant effects experienced by many practitioners.

Properly selected, adjusted, and watched, vaginal pessaries are not only most useful, but actually indispensable instruments in the treatment of uterine displacements. It is their abuse, not their use which has brought them into discredit with some physicians.

Mode of action.—Vaginal pessaries act in three ways: 1, by their size (balls and thick rings of firm material in prolapsus); 2, by the direct support which they give to the uterus or vagina (whether replaced or not), without themselves attempting to restore the normal condition (in anteversion and anteflexion, cystocele, rectocele); and 3, by a peculiar lever action, which tends to replace the displaced, then always retroverted fundus uteri (all the ring pessaries constructed after the principle of Hodge's closed lever pessary).

1. *Pessaries which act by their size* cannot be considered curative, since they necessarily distend the vaginal walls to their utmost limit in order to insure their retention, and therefore weaken and prevent them from contracting and regaining their tone. These pessaries are but makeshifts, and are allowable only where no other curative mechanical appliance or an operation is practicable. In women long past the menopause, with flabby vaginæ, small uteri, relaxed and atrophic ligaments and tissues, whose sexual organs have passed their period of functional activity and usefulness, it is permissible to lessen the chances of a permanent cure by increasing the very condition which produced the displacement, viz., the relaxation of that great uterine support, the vagina. In these cases, and they are all instances of more or less complete prolapse of uterus and vagina, we expect no cure, we know none is possible with or without operation, and we merely wish to make the patient as comfortable as possible for the remaining minority of her life, by keeping the prolapsed organ within the body.

In young, sexually still vigorous women, with tissues which yet admit of restoration to tone and health, it seems to me unjustifiable to injure them permanently and destroy their hopes of permanent cure, by stretching their vaginæ to the utmost with large disks or globes, or by elastic flexible rings which are retained only through their constant centrifugal expansion. We should restore the parts to their normal condition as nearly as possible by astringents, by supports which contract while they support, and if need be by operation, and then, if still necessary, introduce a properly fitting pessary, which, if it does not cure, does not at all events preclude the hope of improvement.

The cases to which these remarks apply are solely cases of prolapsus of the uterus and vagina, and of rectocele and cystocele.

2. *Pessaries which act only by the direct support* they give to the displaced part will be described in the sections on Anterior and Lateral Displacements, and Displacements of the Vaginal Wall. These pessaries, in order to afford this support, must of course have a base upon which to rest. This base is generally offered by the contractile walls of the vagina, or by the perineum or floor of the pelvis, or the symphysis pubis. They act merely as splints to the displaced part, preventing it from becoming still more displaced, and thus, it is true, in an indirect manner, give the attachments of the dislocated organ an opportunity to recover their tone and vigor. It is in this manner that all anteversion and anteflexion pessaries prove beneficial and (perhaps) ultimately curative. As compared with the pessaries next to be described, the pessaries for ante-displacements occupy a somewhat insignificant position, and could be more easily dispensed with than even those which act merely by their size. Anteversion of the uterus is only occasionally of sufficient severity to give rise to serious inconvenience. Emmet even asserts that it is not the anteversion which causes the distressing suprapubic weight and dragging, but the simultaneous downward displacement of the uterus, and that all anteversion pessaries act by lifting the whole uterus up, not merely by supporting the fundus. To a certain extent I believe he is right, but I certainly have seen pessaries which merely kept the fundus away from the bladder, without materially lifting up the whole uterus (such as Gehrung's, Fig. 228, and Thomas' cup pessary, Figs. 238 and 239) give great relief. In anteflexion the same may be asserted, since no severe anteflexion was probably ever cured, no uterus entirely straightened, by an anteflexion pessary. The flexion may be slightly diminished by the support which the fundus gets from the upper rim of the pessary, and perhaps by the slight backward extension of the cervix, but on removal of the instrument the angle at once returns. Dysmenorrhea will, however, be relieved, and sterility may be cured by this slight diminution of the angle of flexion.

Vaginal prolapse can be cured in time by these pessaries, provided the necessary support of the perineum is not entirely lost or is restored by operation. Recently a most excellent instrument has been devised by Gehrung, the largest size of which accomplishes what no other intra-vaginal pessary has done before, except through its size, viz., to retain a prolapsed uterus simply by supporting the also prolapsed anterior wall of the vagina.

3. The *pessaries which act by a peculiar lever action*, and by that action strive to restore the displaced uterus to its normal position, are by far the most numerous, the most frequently needed, the most beneficial, and the most indispensable. They are used exclusively for retro-displacements, either version or flexion. They are all oblong rings constructed on the single or double lever principle first introduced into the doctrine of pessaries by the late Dr. Hugh L. Hodge, of Philadelphia, some twenty years ago. Since then numerous modifications of his original instrument have been made, but the lever principle has been preserved in all of them. The shape of the Hodge pessary is shown in Fig. 252. One curved end (the shorter) goes behind the cervix, the other (longer) in front against the anterior vaginal wall. The patient now being erect, the downward pressure of the bladder and intestines, aided by the increased normal intra-abdomi-

nal pressure during inspiration and walking, presses the anterior bow of the pessary downward, and naturally tilts the posterior end up, and with it the retro-displaced fundus uteri. Therefore, in the very position in which the patient needs the replacement and support most, in the erect, the force necessary to produce this admirable lever action is supplied by natural means.

If the uterus is *not entirely replaced* before applying the pessary when the patient stands, the backward and downward pressure of the still somewhat retro-displaced fundus, with the weight of the super-incumbent viscera, will rest on the posterior arm of the lever and thus tilt up the longer anterior arm against the neck of the bladder. The pressure there may be so severe as to be unbearable. The importance of entirely replacing the uterus before applying a pessary is therefore apparent. When the woman lies down the weight of the viscera relieves the fundus and the posterior arm of the pessary, and the anterior arm becomes loose. This constant rocking motion, which is exerted by every well-fitting lever pessary, whether the uterus is entirely replaced or not, slightly changes the position of the instrument each time, and thus avoids too steady pressure on one spot. But the position of the uterus is not materially changed during the rocking of the pessary, for the latter will always regain its position behind the cervix as soon as the backward pressure by the uterus is relieved in the horizontal position.

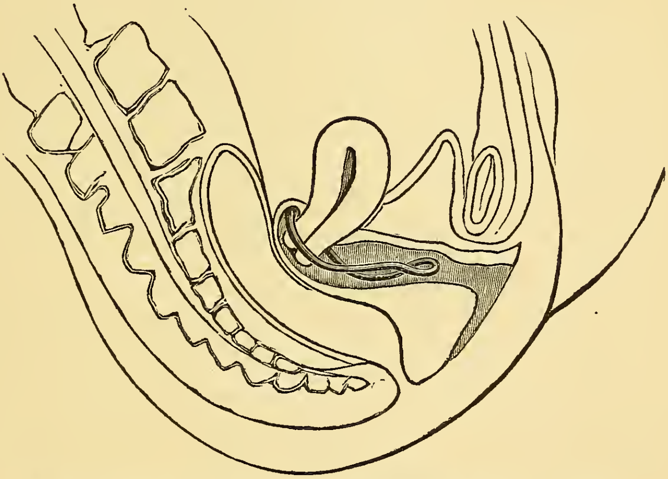

FIG. 227.—Emmet's retroversion lever pessary supporting uterus. (Emmet.)

When the *uterus has been entirely replaced*, as it should be before the pessary is fitted, this action, in my opinion, is reversed, and the pressure in standing is exerted on the anterior arm, and in lying down on the posterior. The latter, however, will be minimal if the uterus remains replaced; only the slight backward tendency of the fundus produced by the dorsal position will be observed.

In accordance with this difference of leverage, as the fundus is replaced anteriorly or not, a lever pessary will but very rarely succeed in replacing a retro-dislocated uterus. Its constant pressure may elongate the posterior vaginal wall, but only by accidental changes of position will the uterus be anteverted while the pessary is worn. If, however, the anterior bar of the pessary derives its support from the immovable pubic bones, then its steady pressure may finally lift up the fundus. Such pessaries will be described farther on, and are often very useful.

In many pessaries the anterior arm of the lever is elongated in order to conform more to the shape of the vagina and prevent the pessary from turning in the vagina. The principle, however, always remains the same; the pressure on the anterior arm is merely distributed over a somewhat larger area. The amount of leverage depends entirely upon the curve of the pessary. Pessaries with sharp curve of the posterior bow (that which is to go behind the cervix) will exert a more powerful lever action on the retro-cervical tissue than those with but a moderate curve.

The sharper the curve the higher will the uterus be lifted, and the more will its ligaments be stretched; this hyper-tension may be so extreme as to give rise to as much discomfort as the original displacement. It is therefore all-important to properly estimate the amount of leverage required and permitted by the degree of displacement, the depth of the posterior vaginal pouch, and the weight of the uterus, in choosing a pessary for a particular case. If too great a leverage is exerted, the uterus may be anteverted; or what is even more likely, the sharp curve of the posterior bow will cause the pessary to press so firmly into the posterior wall of the uterus at the vaginal junction, as to bend the organ backward over the pessary, and thus substitute a retroflexion for a retroversion. The curve of the anterior, or pubic extremity should correspond in degree to the posterior, or uterine arm, that is, the greater the latter, the greater also the former.

The line of support of these lever pessaries is not to be sought at any one spot, neither at the symphysis pubis, nor the posterior vaginal wall, nor the retro-cervical pouch; but wherever the pessary touches the vaginal surface it has a certain amount of cohesion, and if properly fitted, and the vaginal walls have their normal contractility, the pessary is grasped by them and securely held. It moves as they move, and needs no fixed fulcrum upon which to hinge. Still, in order to have a lever action, it must have a resting point somewhere, and this point, in my opinion, is that portion of the vagina extending from slightly below the level of the cervix to the apex of the posterior vaginal pouch. In this posterior pouch the posterior curved bow of the pessary rests, and if the uterus is properly replaced, is caught there, as it were, by suction. Whatever fulcrum the pessary has is at about the level of the external os on the posterior vaginal wall. If this posterior wall is relaxed, or the support of the perineum lost, the ◡ like curve of the wall is destroyed, and this resting-place for the pessary wanting; the instrument, therefore, is not retained, glides down, or must be so large or so broad in front as to act by its size. Its size and shape then retain it, and the pubic bones serve as a fulcrum for the lever action. But it should be understood that in a normal vagina, with proper posterior wall, the pessary has no fixed point as a fulcrum, least of all the symphysis pubis. This is precisely the advantage of the lever pessary, and the reason why it is more easily borne than any other variety. The only point where prolonged pressure of even a small retroversion pessary occasionally produces excoriation is in the posterior cul-de-sac on the posterior aspect of the cervix. A well-fitting pessary should never reach to, and certainly not below, the pubic arch. Those pessaries which fit best and can be worn the longest without removal or injury, are such as are grasped in the posterior vaginal pouch by the suction spoken of, and the anterior curve of which hangs almost free in the vagina, merely touching the anterior wall.

In some cases a lever action is not desired, and still a lever pessary is used. Such are cases with flabby relaxed vagina, heavy, deep-seated uterus, gaping, flabby vaginal orifice; and the pessary is used as a mere support by its size and shape. A broad, but slightly curved Hodge is then used, which is retained through its broad anterior bar pressing against the pubic bones. An indentation in the transverse anterior bar, saves the sensitive urethra from pressure. This form of pessary is also useful in excessively movable uterus.

How to adjust pessaries.—A cardinal rule in the employment of pessaries is, to *fit every pessary to every case.* There are as many different shapes and sizes of vagina as there are of hands and feet, and every woman has her own peculiar vagina as she has her face. While, therefore, many pessaries may fit many vaginæ, exactly as one size of gloves or shoes may fit many different people, this is only because, among many vaginæ, there may possibly be a certain number alike. Only by careful examination and measurement, can the dimensions of the vagina be ascertained, and in accordance with the result obtained, the proper variety, shape, and size is selected. Emmet relates that among 500 or 600 old pessaries in his office, which had been in as many vaginæ, there were not to be found two exactly alike. To a man with Emmet's own peculiar mechanical ingenuity and dexterity, and holding his views on the dependence of uterine displacements on contractions of ligaments and para-uterine cellular tissue, this enormous variety of vaginal pessaries undoubtedly appears indispensable. Fortunately for the general practitioner and the man without special mechanical ingenuity, it is not always necessary to have the pessary fit every fold and curve of the vagina with absolute accuracy. Many patients can be benefited and cured by using the pessaries which are kept wholesale in the shops, and which are made in certain fixed sizes and shapes. But one thing is certain, and that is that no man without at least a certain amount of mechanical knack, can hope to benefit his patients with pessaries. In the old times when the object of all pessaries was merely to lift up or sustain the uterus without regard to the variety of displacement, and with no curative object in view, of course anybody could adapt one of the crude pessaries then in use. But the scientific and rational employment of our present vaginal supporters requires not only a thorough knowledge of the normal sexual organs and their surroundings, and an intimate acquaintance with the pathological condition in each particular case, but also a certain amount of mechanical ingenuity and manual dexterity. Without these requirements, the operator is more likely to do his patients harm than good, and will probably disappoint them, as much as he will himself be mortified at the failure of his efforts. But, probably he will console himself by blaming the pessary!

This dexterity in modelling and shaping pessaries can really never be thoroughly acquired, unless an inherent mechanical skill is present. The practitioner need not therefore be ashamed of his want of success, for not every one of us can be an Emmet or a Thomas. And a clear understanding of the nature of the case and of the treatment required will enable the majority of physicians to benefit their patients with displacements very materially.

To secure a perfectly fitting pessary, Emmet models one of soft block-tin for every case, lets the patient wear it until he has satisfied himself that it suits her, and then has it reproduced in hard rubber or aluminium. In this way a perfect fit must be obtained, provided the original model was correct. Many physicians, who find none of their supply of pessaries to fit a certain case, use the pessaries of copper wire covered with soft rubber, moulding them to the desired shape; and I confess my preference for these to those of tin, because the latter are too thin and liable to bend or cut into the tissues. These soft-rubber pessaries can be worn for several weeks or longer with proper regard to cleanliness, therefore quite long enough to judge whether the shape is a good one and should be fixed in hard rubber.

The copper-wire pessaries covered with hardened soft rubber (Chamberlain's) or celluloid (Otto's) can be molded and will retain their shape, and are not changed by the vaginal secretions. As yet, the hard rubber is universally employed for vaginal pessaries, and certainly is, by its durability, high polish, neatness and cheapness, the best material for pessaries.

Only when it becomes necessary to change the shape of the pessary, is the need of a flexible material felt which shall possess the durability and the other good qualities of the hard rubber. In the celluloid pessaries this want would seem to have been supplied.

In estimating the variety, size, and shape of a pessary, the physician should ascertain: 1, the nature and degree of the displacement; 2, the mobility of the uterus; 3, the length and width of the vaginal canal; 4, the dilatability and contractility of its walls; 5, the depth and width of the posterior vaginal pouch when the uterus is replaced (this applies particularly to retro-displacements); 6, the weight, size, and density of the uterus; 7, the dimensions and length of the intra-vaginal portion of the cervix; 8, the presence or absence, and the seat of any tenderness in the parametrium or uterus; 9, the degree of laceration of the perineum, or of support afforded by that body if not torn; 10, the amount of vaginal secretion; 11, the tension of the anterior vaginal wall with the bladder; 12, the presence of a prolapsed ovary at the bottom of Douglas' pouch.

The *nature and degree of the displacement* is of course the first thing to be ascertained. That unknown or uncertain, the selection of a supporter is impossible. The diagnosis is made either by finger and bimanual method, or by the sound, as already described. The degree of displacement is marked in the same manner, and from it and the symptoms the necessity and variety of the pessary determined. This is usually a simple enough matter (see Figs. 207 to 212). But the particular shape, size, and curve of the instrument is by no means so easy, and to decide upon these points the other factors enumerated should be inquired into.

The *mobility of the uterus* is certainly, next to the nature of the displacement, the most important point in this whole question, especially as regards prognosis; for what good does it do us to know how the uterus is displaced, if it is fixed and immovable by cellulitic and peritonitic adhesions and cannot be replaced? As no pessary should be introduced without the uterus having previously been replaced, the effort to accomplish this should be made after one of the methods described in the respective chapter. If it fails, the idea of placing a pessary should be abandoned, unless in the occasional instances where the adhesions are so old and elastic that an effort may be made to stretch them by the steady upward leverage of the posterior end of the pessary (this also applies only to retro-displacements). If the attempt succeeds, the pessary should not be applied until perfect replacement has been obtained. The depth of the posterior vaginal pouch is vastly greater when the uterus is anteverted than when the retro-displaced fundus presses it down.

The *length and width of the vaginal canal* will determine the breadth and length of the pessary.

The vaginal orifice may be quite large and still the vagina narrow with healthy, contractile walls; or, on the other hand, the orifice may be narrow and the vaginal pouch roomy and spherical. In the latter case a larger pessary may be needed than can easily be passed through the vaginal orifice, and strong retraction of the perineum is required to admit it.

The length of the vagina is ascertained, in the erect position, by the finger or by passing the straight whalebone stick or the sound up behind the cervix to the limit of the pouch, and marking the spot where it touches the symphysis pubis. Beyond this point no vaginal pessary should descend. The width of the vagina is of course easily ascertained by the finger.

The dilatability and contractility of the vaginal walls is an important point, because the rule for all pessaries acting by leverage, indeed all which do not act only by their size, is that they shall not dilate the vagina sufficiently to produce tension, or to cause the pessary to press into the tissues. A very dilatable vagina with lax walls will therefore require and permit a larger pessary than a canal with normally contractile power, such as the healthy vagina possesses. It seldom happens that a pessary, which is to act on the lever principle alone, need be larger than three inches long and one and a half inch wide.

The *depth and width of the posterior vaginal pouch after replacement of the uterus* determines, to a great extent, the amount of the curve of the posterior portion of the pessary (retroversion only, again) and the probability that the pessary will be retained. The deeper the retro-cervical pouch, the easier to find a suitable instrument. The shallower the posterior pouch, the more difficult to find a pessary which will retain its proper position, and do its duty by pressing the pouch upward and the body of the uterus forward. In many cases the posterior vaginal pouch requires elongating by mechanical pressure from pessaries until it has been pushed so far up as to give the vaginal pessary a purchase on the body of the uterus. This may be done either by changing the length and curve of the vaginal pessary from time to time, and thus gradually stretching the pouch up to a level with the internal os behind, or by supporters connected with an abdominal bandage. It may require months to obtain this result. In congenital retroversion of an anteflexed uterus, or congenital shortness of the vagina and intra-vaginal portion of the cervix (conditions which are often found in married but sterile women, and which Emmet believes to be due to unappreciable inflammatory contraction of one or both broad ligaments), this deformity of the posterior pouch is very marked and exceedingly difficult to change, requiring, at times, the aid of an intra-uterine stem as a handle by which to raise up the uterus with a lever pessary.

In no case should the uterine arch of the pessary be so sharply curved as to press directly against the cervix at its junction with the vagina. The uterine curve should be straight upward, not forward also, and the pressure be exerted against the apex of the posterior vaginal pouch. The uterus should rest against the posterior curve of the pessary as a person rests against the back of a chair, and any pressure exerted on the uterus should proceed from the whole uterine curve, not from the posterior transverse bar only.

The *weight, size, and density of the uterus* also influence the selection of the pessary. The heavier the uterus, the larger the pessary (within proper limit), and the thicker its branches in order to avoid cutting into the tissues. Besides, in retro-displacements the posterior bar of the pessary may need to be enlarged by addition of a bulbous expansion (see Fig. 258) in order to avoid the erosion and cutting of the pessary into the posterior wall of the heavy uterus. The same form of pessary may also be required in cases where the normal density and firmness of the uterine tissue has become so much impaired as to allow the uterus to gradually bend over the posterior bar of the slender pessary, as though there were a joint at that spot. This latter accident is a source of great annoyance to patient and physician, and may tax the ingenuity of the latter greatly before a proper supporter is found. The best way probably is, if the bulb fails, to construct a pessary shaped like the capital letter U, in the centre of which the uterus rides as in a saddle. The posterior bow reaches up so high that the point of flexion is below the cross-bar. The difficulty of introducing these pessaries is the objection to them; it may often be overcome by inserting them through a Sims speculum.

The *dimensions and length of the intra-vaginal portion of the cervix* should be noted, because a large cervix requires a correspondingly large pessary, and the length of the intra-vaginal portion determines the depth of the vaginal pouch.

The *presence or absence, and the seat of tenderness in the parametrium or uterus* are exceedingly important points in deciding upon the advisability of introducing a pessary at all, and upon the variety, shape, and size. If there is any evidence of acute inflammation of uterus or adnexa, the pessary is counter-indicated. If there be a tumor in the pelvis due to chronic cellulitis or peritonitis, a pessary should not be used because it is of no service, the uterus being fixed and needing no support. But if mere localized tenderness is felt in the vaginal pouch, without any appreciable swelling, the question may arise whether this is due to subacute inflammation or to the pressure of the displaced uterus; if the former, the pessary will do harm, if the latter (and replacement of the uterus may decide the question) of course the pessary should be applied. If the tenderness be very slight, the pessary may be so chosen or changed as to avoid pressing on this spot; this is frequently done with retro-uterine tenderness, the exact nature of which is not clear. If the uterus is tender to the touch, as it very often is in displacements (ante- and retro-), the question comes up whether this tenderness is not due to the congestion produced by the displacement. This is very frequently the case, and the reposition and retention of the uterus by a pessary is therefore called for. The tenderness will then soon disappear. Often, however, the tenderness is so great (chiefly in retro-displacements) that preparatory treatment is required before the pressure of the pessary can be borne.

The *degree of laceration of the perineum, or of support afforded by that body if not torn*, is important in selecting a pessary; for a larger instrument is required if the normal support of the perineum is wanting, or the vaginal orifice gapes. It is not because the pessary rests upon the perineum, but because the natural ◡ curve, to which the lever pessary conforms, is wanting when the perineum is destroyed or relaxed. It frequently becomes necessary to restore that body before a pessary of a size corresponding to the undilated vaginal canal can be retained. A larger instrument, which would be retained, exerts too great a tension on the vaginal walls and will soon give pain and produce ulceration. If an operation is impracticable, the uterus may require to be supported by a pessary which acts through its size or by expansion, and that this is injurious has already been pointed out.

The *amount of vaginal secretion* will influence the actual placing of a pessary, rather more than its shape or size. If there is a profuse vaginal leucorrhea, particularly if the discharge is discolored and is seen through the speculum to proceed from a maceration or abrasion of the vaginal epithelium, a pessary should certainly not be applied. The cause of the discharge must be removed, in the manner described under Applications to the Vagina, before it would be wise to subject the mucous membrane to the inevitable irritation of a pessary. Besides, a profuse chronic leucorrhea is a probable indication of a relaxed flabby vagina.

The *tension of the anterior vaginal wall with the bladder* will affect the selection of a pessary, since if that part is relaxed or prolapsed (cystocele), a peculiar form of pessary is required, which will not only support the uterus, but also the anterior vaginal wall. Should the position of the uterus be normal, the cystocele alone requires to be supported, and for this purpose a special variety of pessaries is employed.

The *presence of a prolapsed ovary at the bottom of Douglas' pouch*, will often greatly interfere with the wearing of a pessary. Momentary pressure on the ovary with the finger gives acute pain if the organ is congested or inflamed; but even the normal prolapsed ovary will soon resent the steady pressure of a pessary and call for its removal. The constant, dull, aching pain in the back and hips will then depend on this pressure. I recently saw a case where the ovary was latero-prolapsed and lay to the left of the cervix; it appeared to be fixed by adhesions. As the patient had an acute retroflexion, I deemed a lever pessary necessary and introduced one after replacing the uterus. The pessary did very well so far as the uterus was concerned, but still the patient complained of a dull ache in the left hip, which soon became unbearable. The cause was found in the steady pressure exerted by the pessary on the prolapsed and adherent ovary, a pressure which had not been exercised when the pessary was first introduced. The gradual adaptation of the parts to the pessary had brought it in contact with the ovary. As the latter could not be replaced, and I could contrive no pessary which would avoid the ovary and at the same time support the retroflexed uterus (which, by the way, was not easy) I was, after several ineffectual trials, forced to let the patient do without any pessary. She preferred to keep her retroflexion, which gave her far less discomfort than the pressure of the pessary on the ovary. Perhaps a greater amount of mechanical ingenuity might have led to the construction of a suitable instrument, and here again it is the special ingenuity of the physician which enables him to conquer difficulties, unsurmountable by others less dexterous. Peculiar shapes must be given to the pessaries so as to avoid pressing on the ovary and still support the uterus. Or the posterior crossbar of a retroversion pessary is made very broad or very thick so as to put the pouch to the stretch and fill it out, and thus prevent the ovaries from descending. Or the central portion of the crossbar is bevelled out so as to remove pressure from an ovary situated at the bottom of Douglas' pouch. The diagrams in the section on Retroversion Pessaries will illustrate this subject.

In many cases the vagina will gradually adapt itself to the size and shape of the pessary, and I have spoken of cases where this is desired. But these cases are the exception, although they frequently occur. The rule is that the pessary should be carefully adjusted as regards size and shape to the dimensions and curves of that particular vagina; and that the size and shape should be altered whenever a change in the vagina requires it.

It will be seen that many of the above remarks apply chiefly to pessaries for retro-displacements.

General Rules for the Introduction and Supervision of Pessaries.

The most important rule unquestionably is, always to replace a dislocated uterus before attempting to select or introduce a pessary. Only when the uterus is replaced can the length, size, and shape of the vaginal canal be correctly estimated, and the corresponding properties of the pessary be imparted to it.

This rule applies only to retro-displacements and prolapsus. An anteverted or anteflexed uterus need not be replaced before applying a pessary, because, in these displacements, no rectification of position or cure is expected or attainable by a pessary, the only object of which is to support the displaced fundus until its natural supports, the utero-sacral ligaments and the vaginal column, can regain their tonicity.

A second precaution, never to be overlooked, is not to leave a pessary in the vagina which is so tight that the finger cannot be passed between it and the vaginal wall. If the vagina is put to the stretch between the bars of the pessary, the latter is too large and will infallibly sooner or later cut into the tissues. Before being introduced, every pessary should be dipped in warm water and then thoroughly covered with vaseline, oil, glycerine, or soap. Its introduction is greatly facilitated by this practice. If it is a complex instrument it may be well to apply a carbolized ointment to prevent its becoming rapidly offensive.

A pessary having been fitted according to the directions above given (the method of introducing pessaries will be described with each instrument), it is important to ascertain whether it really fits the patient under the circumstances when she is most likely to need its support, viz., in the erect position. Every patient who has just had a pessary introduced, should therefore be examined standing, and told to bear down, crouch, or stoop, in order that the finger in the vagina may learn whether the pessary withstands the pressure and weight which the superincumbent viscera and the necessities of daily life, or the patient's occupation will exert upon it. Only by this erect examination can the physician actually tell whether he has succeeded in selecting a perfectly suitable instrument. Not only at the first visit, but when the patient calls again, at regular intervals to have the pessary inspected, should this examination in the erect position be repeated. Even when it is desirable to remove the instrument the patient need not lie down, which is necessary only when the uterus is to be replaced or the old or a new pessary introduced.

The patient should be directed to go about her usual occupations, to walk, carry burdens, in fact to put the pessary thoroughly to the test (provided of course, her general health and the tenderness of the parts permit), and to return in several days, certainly within a week, in order to have it looked after and any displacement rectified, or a new one introduced, if necessary. The patient should be told that she is wearing a pessary and also how to remove it, which must invariably be done at once if it gives pain. A well-fitting pessary should *never* give pain, unless the rule regarding uterine or para-uterine tenderness has been disregarded.

A rule without exception, therefore, is that no pessary should be worn which gives pain, and that every such pessary should be at once removed, as soon as the seat and continuance of the pain shows that it is caused by the pessary. A patient should be able to walk, ride, dance, use the sewing-machine, in fact do anything she could do in health, with a well-fitting pessary. Should she not be able to do all these things, it does not necessarily prove that the pessary does not fit or accomplish its purpose, for the inability may depend on general debility or upon other local conditions than the displacement (subinvolution, hyperplasia, laceration of cervix). But as the object of the pessary is to enable the patient to go about her daily duties, if necessary earn her bread, it should be the endeavor of the physician to accomplish this; therefore, if the first effort and the first pessary are not successful, even though it appears to fit, another and still another should be tried until the proper one is found or the attempt abandoned.

It has already been stated that a well-fitting pessary should give no pain; but more than this, it should not even cause discomfort; the patient should not be made aware, by any physical sign, that she is wearing such a thing; and still more, it should give her the relief from pain and distress for which the instrument was introduced. This relief may not be instantaneous, it may even be delayed for several days, until the parts have accommodated themselves to the instrument; but if her symptoms were due to the displacement, and the supporter relieves that displacement, the symptoms must inevitably disappear sooner or later. If they do not, then, in all probability, some other affection is the cause of suffering.

Another reason for informing a woman that she is wearing a pessary, than to enable her to remove it if it gives pain, is that she may possibly not return as directed, and go on for years without knowing that she is wearing a pessary, until finally the foreign body becomes so foreign to its surroundings as to give rise to ulceration, even perforation of rectum or bladder, and to a profuse sanio-purulent offensive discharge, which has been taken for cancer. Thus, but recently, a physician in Maryland removed from a patient, supposed to be suffering from cancer of the uterus, a Hodge pessary which had been introduced, unknown to the patient, five years before, and had worn its way deep into the vaginal walls. Dr. Rodenstein, of New York, lately met with a similar case, also of supposed cancer, which he found to depend on the retention of a large round hard-rubber ring, introduced thirteen years before in Ireland for prolapsus uteri. It was completely surrounded by granulations. In both these cases, the physicians had told the patients to return, but not that a pessary had been introduced. Feeling relieved, the patients did not return, and, consequently, no opportunity was given the physicians to remove the pessaries.

But the patient should also be told that the pessary will give her no pain, that she will not be conscious of wearing it, and should not think about it. As soon as she is conscious of wearing something in her vagina, there is trouble somewhere which needs investigation.

If the pessary should protrude from the vulva, the patient should be taught to push it back gently. A pessary may fit perfectly when first introduced, but become displaced by exercise, motion, lifting, defecation. The converse may also hold good, although more rarely, that a pessary which at first does not fit perfectly, after a few days has shaped the vagina to its proportions and now answers very well.

It is advisable to keep a woman in bed, or on a lounge, after introducing a pessary only when it is intended to gradually accustom the parts to the instrument, or when the parts are too tender to endure the pressure exerted by the pessary when the latter is pushed down by intra-abdominal pressure. In the latter case it will generally be inadmissible to introduce any hard pessary, and the parts need preparatory toughening by cotton tampons soaked in glycerole of tannin. This preparatory treatment may occupy several weeks or longer, daily pledgets being introduced; the posterior cul-de-sac may be very usefully elongated in the same manner.

The bowels should be kept soluble; otherwise the pessary is liable to be displaced. The loaded rectum weighs down on the pessary, and when the mass of hard feces is at length forced down by a brisk cathartic, it catches in the posterior crossbar of the pessary and dislodges it. Even a perfectly fitting pessary will be displaced in this manner. I have frequently had patients return to me with their pessary in their pocket, saying that it had been displaced, and had come away, or they had removed it while straining during defecation, their bowels not having been moved for several days; and yet this very pessary had been worn for months before, and had been a perfect fit.

Patients with retroversion and prolapsus should be directed to assure the proper adjustment of the pessary, and temporarily relieve the downward and backward pressure exerted by the uterus on every pessary, by assuming the genu-pectoral position, and expanding the vagina with air (as described in the chapter on Reposition of the Uterus, see Figs. 213 and 214) at least once every day. The best time is on retiring at night, the erect position not being resumed until the next morning.

Every pessary, to a certain extent, irritates the vagina, and, sooner or later, produces a discharge, which will also be more early and profuse if the pessary is made of a destructible substance, such as soft rubber.

Patients should therefore be told to take cleansing injections of soapsuds, or tepid water, or if there be already a leucorrhea, a teaspoonful of alum-powder, or sulphate of zinc may be added to the pint of water. A hard-rubber pessary may not produce a discharge for several months, but when it does it is well to remember that the instrument may have produced an abrasion of the epithelium at some spot, which calls for its removal. If the discharge of a woman who has been wearing a pessary for some time becomes greenish, or sanious, the chances are very greatly in favor of the pessary having produced an abrasion, and the patient should be informed of this symptom. All pessaries, even those of hard, smooth, impervious material, are liable, in course of time (one or more years), to become incrusted by the deposit on their surface of salts from the vaginal secretion. They then become rough and irritating, produce abrasions, and foul discharge, and should of course be removed. The soft-rubber pessaries are most easily changed, and become discolored, macerated, and rough often after a few weeks. They must, therefore, be more carefully watched, and more frequently removed and cleaned than those made of hard rubber. The least irritating substance undoubtedly is glass, but its brittleness prevents other pessaries from being made of it than the large rings for prolapsus.

In order to avoid this incrustation and abrasion, and to assure one's self that the pessary is still in place and doing good, every patient wearing a pessary, no matter of what construction or material, or for what displacement, should be examined from time to time. This interval with soft pessaries should not exceed two weeks, with hard instruments one to two months. Therefore, always tell your patient that you wish her to report every month or two, or oftener, so long as she is wearing the pessary, and give her to understand most distinctly the reasons for this request, and the risk she runs if she fails to comply with it. I have frequently seen more or less severe ulceration of the vagina from non-compliance with this direction.

It is advisable, therefore, to remove every pessary, even though it is in place, now and then, inspect the vagina through a speculum, and, if sound, re-introduce the instrument at once. The finger cannot tell that there is an erosion, unless it is deep, although it may be strongly suspected if the finger is tinged with muco-purulent matter on being removed, and no endotrachelitis or cervical laceration is present. I have repeatedly found quite large superficial erosions behind the cervix from pressure of the crossbar, when no pain had been experienced. Some vaginæ no doubt become more easily eroded than others, and those in which the epithelium appears most tender should be most carefully watched.

A pessary needs occasional changing even when it has done well. The shape of the vagina alters in course of time, and the old pessary no longer does its duty as well as when first inserted. A new one, appropriately shaped, should therefore be substituted.

It is a good plan also to remove a pessary from time to time and give the parts a rest of a few days, using hot-water injections as an astringent in the meanwhile; or introducing tannin tampons for several days. If no evidence whatever exists of pressure by the pessary, this rule, of course, need not be observed.

Finally, the pessary may be removed after a variable lapse of time, in order to see whether a cure of the displacement has been effected. This time varies from three months to as many years. A cure may be expected chiefly in retro-displacements; in prolapsus of the uterus and vagina, but rarely if the displacement was of long standing. Ante-displacements are restored by but one pessary with which I am acquainted, Gehrung's, for it gradually retroverts the uterus.

Prolapsus uteri may be cured unintentionally by a pessary, which has been allowed to remain so long that it has produced ulceration occupying more or less of the vaginal vault. When the ulceration heals, the uterus and vagina are retained by the resulting cicatrices. Such a case recently came under my notice, a round glass disk having been retained for five years.

If a pessary has become fastened in the vagina by granulations, and is covered by vaginal tissue, it may be very difficult to remove. If a ring-shaped pessary, it may lie in a canal to which there is no access, except by cutting through the overlapping tissue at one spot, clipping the branch of the pessary with strong nippers or bone forceps, or dividing it with a chain-saw, and then seizing it firmly in a forceps, withdrawing it with a rotary motion until the opposite part of the pessary arrives at the opening; this is also clipped and each half of the pessary then withdrawn separately.

Sexual intercourse is not prohibited by the presence of a pessary. Indeed, if this were so, how could women sterile through uterine displacement be cured of their sterility? Of course, I mean pessaries which do not obstruct the vagina so as to prevent intromission and the entrance of the spermatozoa into the cervical canal. Such are those chiefly used for anterior and retro-displacements. Sterility due to displacement is often cured by wearing such a pessary. A certain amount of caution on the part of the husband is of course advisable, in order that the pessary may not be dislodged or the male organ or female parts injured.

After the removal of a pessary, cleansing or astringent injections may be required for a few days; or the hot vaginal bath to preserve and promote the contractility of the tissues.

An opinion as to the permanency of the replacement of the uterus by the pessary after removal of the latter should be guarded, since the uterus may remain replaced for a few minutes, hours, even days, and then on any more than usual exertion or strain by the patient return to its former displaced position. After removing a pessary permanently, it is therefore always best to direct the patient to call again in a week or thereabouts, when an examination will reveal whether she is cured of her displacement or not.

In concluding these remarks on the general and special rules for the application of pessaries, I will merely repeat what probably has already become sufficiently apparent, viz.: that the mere introduction of a pessary by no means concludes the connection of physician and patient for that particular affection. The patient should be informed that the proper fitting and supervision of a pessary requires a certain number of interviews; that a different size or shape may be called for sooner or later; that only a careful watch over the pessary will prevent its doing injury; and that, finally, the cure of a displacement of the uterus is a tedious and difficult matter, and well worth the trouble, attention, and expense the patient is obliged to devote to it. All these particulars are necessary, since many patients think that all they need do to be cured of their displacement is to have a pessary introduced, and then go about their business. The danger and uselessness of such a course has been repeatedly pointed out.

a. *Pessaries for Ante-Displacements of the Uterus.*

Pessaries for the support of the ante-displaced fundus uteri generally possess one mechanism which inserts itself between the symphysis pubis and the uterus, and another which is intended to draw the cervix forward and thus tilt the fundus backward. This is the only correct principle upon which anteversion pessaries should be constructed. This traction may be exerted either by a ring encircling the cervix, or by the transverse or upward expansion of the anterior vaginal pouch. The ring which encircles the cervix should not be so large as to distend the posterior pouch of the vagina; for if it does, it will draw the cervix backward, tilt the fundus still more forward, and thus counteract the supporting effect of the pessary.

Pessaries which act in this faulty manner are those of Thomas, seen in Figs. 232 and 233, the so-called "buckle pessary"; that of Hitchcock, an elastic ring covered with soft rubber (Fig. 236), and to a less extent that of Graily Hewitt (Figs. 247 and 248). The best anteversion pessary, in my opinion, undoubtedly is that of Gehrung, of St. Louis (Fig. 228). A very good pessary, also acting on the correct principle of distending and elevating only the anterior pouch is the "cup-pessary" of Thomas (Fig. 239). Any pessary which supports the uterus in any way, such as a simple elastic ring (Fig. 275), or a perforated block of soft or hard rubber (Figs. 249 and 250) will also give relief in anteversion. But these latter instruments will act only by lifting up the whole uterus, which I have already stated to be usually somewhat lower in the pelvis, than normally, in anteversion. The fundus alone is lifted up only by pessaries properly constructed for that purpose.

The difference between anteversion and anteflexion pessaries is but slight. Those for anteflexion, being required to straighten the uterus as well as to lift up the whole organ, need to possess a higher anterior bar than in anteversion, and a ring to draw the cervix forward, for there is generally some anteversion with the flexion. For this purpose Thomas' cup-pessary (Fig. 239), and Graily Hewitt's cradle-pessary (Fig. 247), have best satisfied me. But it may be as well to understand that no vaginal support will straighten an anteflexed uterus, not even Gehrung's, which lifts the fundus up better than any other I have tried. Only an intra-uterine stem will accomplish this perfectly. The benefit derived from pessaries in anteflexion probably depends mostly upon the relief of the anteversion. But, I believe that the constant pressure of the smooth wall of Thomas' cup, or Gehrung's anteflexion pessary, against the flexed anterior wall may, after a while, somewhat mitigate the acuteness of the angle. A *cure* of an anteflexion is not to be expected by a vaginal support.

The best anteversion pessary, therefore, in my opinion, is that of Gehrung, the "double horseshoe" pessary. It is simply a single lever Hodge pessary bent upon itself, one bar being slightly longer than the other. This pessary rests on the floor of the pelvis by its two lateral curves R and L, the superior and inferior arches S and I being in the anterior vaginal pouch between fundus uteri and symphysis pubis. Obviously, there can be no anteversion when this pessary is properly fitted. Gehrung himself describes the pessary as resting with its whole lower arch on the floor of the pelvis, and the uterus reclining against its superior curve, as shown in the cut taken from Gehrung's article on "Mechanical Gynecology." But my experience, and it has been quite large since I really learned from the inventor himself, about a year ago, how to use this pessary properly, is that the pessary rests, as already described, on the curves R and L, and therefore stands more upright, whereby it elevates the anterior pouch still more. The uterus then leans against the whole superior arch, not within it, as Gehrung draws it. By this position, coition is rendered possible, which was not practicable in the other position unless the largest size was used. But the expansion of the vagina being lateral, and the peculiar shape of the horseshoe also giving the pessary the greatest separation of the bars in a transverse direction, there is no obstacle to the immissio penis, which would exist if the pessary lay as its inventor describes it. This modification of the author's directions was not sought at first, although I recognized the disadvantage as regards coition; but established itself, for I found that gradually the pessary always assumed the position which I now give it. Seeing that the coition difficulty was thus removed, and the fundus thoroughly supported, I have since introduced it in this manner. The point of support of this pessary is the posterior vaginal wall and perineal body, its resting-place the sym-

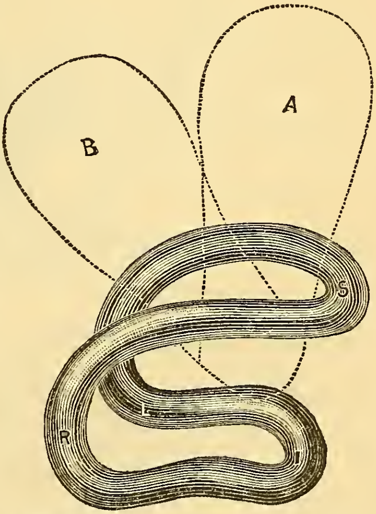

FIG. 228.—Gehrung's anteversion pessary: A, anteversion; B, retroversion. (Gehrung).

physis pubis against which the inferior arch presses. The superior arch supports the uterus. No part of the pessary extends into the posterior part of the vagina.

The construction of the pessary is apparent from the cut. It will be noticed that the superior arch projects in front over the inferior. The elevation of the fundus is increased by this projection. By separating the lateral branches its retentive power is increased (Fig. 230).

Gehrung's pessary comes in five different sizes, the smallest of which can be introduced into any virgin with normal hymeneal orifice; the largest is used for very large vaginæ, prolapsus, and cystocele.

The manner of introducing it is as follows: The pessary is placed on the table, or the palm of the left hand, with the superior convex arch S downward, the inferior arch I above, the open part (curves R and L) pointing toward you; seize curve L with thumb and forefinger of your right hand, separate the labia with the same fingers of the left hand, the patient being in the dorsal position, and insert curve R into the vagina to the right of the patient, until three-fourths of the instrument are buried within, then rotate it on point R as on a pivot, by pushing curve L toward the fourchette and the left side of the patient, so that at the same time the curve L slips into the vagina, the arch S will turn upward under the body of the uterus, and the arch I downward to the os pubis. Then press the uterus gently up with the pessary, and see that the curves R and L rest squarely on the posterior vaginal wall.

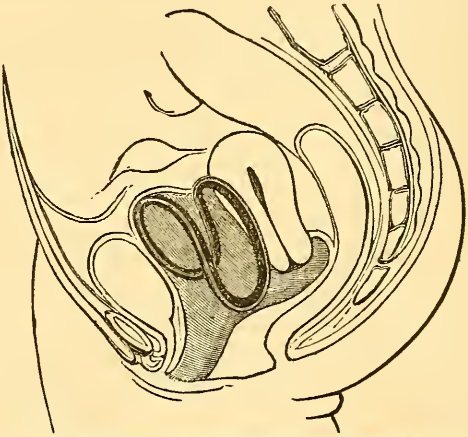

FIG. 229.—Position of Gehrung's pessary in anteversion. [The pessary is too large in proportion to the uterus in this cut]. (P. F. M.)

If the vagina is so large, and its walls so lax that the pessary seems likely to slip down or out, a pledget of cotton, soaked in glycerole of tannin, may be placed between the bars of the pessary for several days. Or, the branches of the pessary may be separated a little more, so as to distend the vagina laterally still more. I have several times seen this pessary elevate the uterus so well as actually to retrovert it in the course of a few weeks. In that case, it should be removed for a few days. In one instance I was obliged to remedy the retroversion by a lever pessary.

If the pessary is too small, or has not been properly adjusted, its superior (longer) arch may slip behind the cervix, which organ is then found between the two curves of the double horseshoe. The pessary then of course fails in its object, and may even give pain. By using an instrument with more widely separated lateral branches, this accident will be avoided.

The anteversion pessaries, constructed by adding a movable anterior bar to a Hodge lever pessary, all possess the same defect, that the posterior arch stretches the posterior vaginal pouch and counteracts the upward action of the movable bar. While they undoubtedly elevate the fundus and the whole uterus, they do so at the expense of a considerable dilatation of the vagina, and the pressure necessarily exerted by the anterior movable bag is likely to produce excoriation.

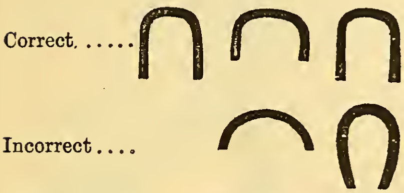

FIG. 230.—Diagram illustrating separation of lateral branches of Gehrung's pessary to increase its retentive power. (Gehrung.)

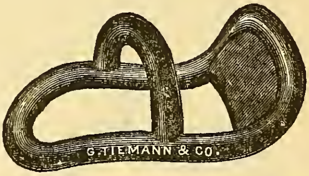
G.TIEMANN & CO.

FIG. 231.—Woodward's pessary for retroversion with anteflexion.

In retroversion of the anteflexed uterus they possibly may do good, although generally the posterior pouch is too shallow to give the pessary a sufficient purchase to hold or lift up the fundus.

The anteversion pessary, shown in Figs. 232 and 233, is a modification of Hodge's lever, again modified by Thomas, and is introduced closed. The patient may occupy either the dorsal or lateral recumbent position. The difficulty about this pessary is that the length of the movable bar renders it difficult to open and separate it when the pessary is in the vagina. This is done by passing a piece of tape around the movable bar, and seizing both the ends with the right hand outside of the vulva. The left hand separates the labia, and the pessary is introduced closed by the right hand, with the upper end and movable bar foremost. As soon as the arch reaches the cervix, the left index finger pushes the posterior arch backward and upward under and behind the cervix, while simultaneously the right hand seizes the tape, and by it pulls the movable bar forward as far as it will go. This is the difficult part of the maneuvre, as the tape is liable to slip; besides, the rapid forcing up of the anterior vaginal wall

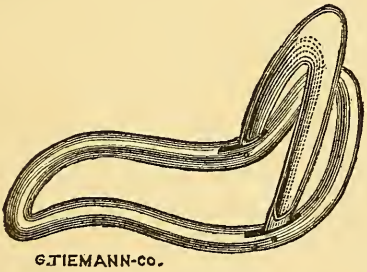
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FIG. 232.—Thomas' anteversion (buckle) pessary, closed.

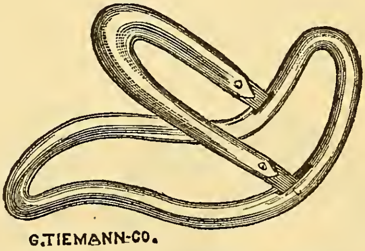
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FIG. 233.—Thomas' anteversion (buckle) pessary, open.

by the movable bar gives pain. If introduced on the side, the pessary is inserted with its concave surface downward, and passed on until the anterior lip of the cervix is touched, when the left hand (this time) pulls forward the bar by the tape, and the right index finger lifts the posterior arch of the pessary over and behind the cervix. This manœuvre will be fully discussed in describing the application of lever pessaries. The uterus now rides between the posterior arch and the movable bar, as in a saddle, or as though suspended by two ropes. This pessary is removed by drawing on the sub-pubic arch with the index finger, when the buckle will fall back as the posterior arch is drawn down, and the pessary is removed closed, as it was introduced. The great disadvantage of this pessary is the tendency of the movable bar to be displaced backward by the motion of the anterior vaginal wall in respiration, and varying fulness of the bladder. The cervix is then squeezed between the movable bar and the posterior arch, and may be so severely compressed as to become ulcerated, and give rise to great pain. A rubber band has been attached to the top of the movable bar and the anterior pointed curve, to draw the bar forward, and prevent its displacement; but this band easily decays, and becomes offensive. This pessary is but little used now, except where marked anteversion and descensus are combined.

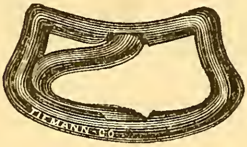

Fig. 234.—Thomas' anteversion pessary, closed.

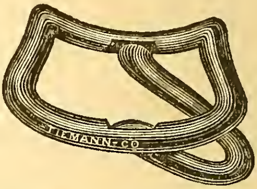

Fig. 235.—Thomas' anteversion pessary, open.

The pessary shown in Figs. 234 and 235, is a Hodge single lever with a sharp movable bar attached, which projects under the pubic arch as a means of fixing the pessary, while the upper broad bar presses up the anterior vaginal wall. It is introduced closed in the back or lateral position, and the movable bar and posterior arch are separated by a tape precisely as in the foregoing instrument. It has served me much better for cystocele, than for simple anteversion, and is less liable to injure the anterior wall than the buckle instrument. This instrument is removed by seizing the fixed, broad anterior arch and drawing it downward and sidewise through the vaginal orifice, when the movable bar is tilted backward, and the pessary is withdrawn closed.

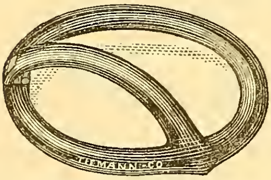

Fig. 236.—Hitchcock's anteversion pessary.

Hitchcock's elastic ring pessary is made of watchspring covered with soft rubber, with a cross-bow, which is to go in the anterior vaginal pouch. It does good service in relaxed vaginæ, and I had a patient wear one with great comfort during a summer's sojourn in the Adirondacks. But it has the disadvantage of all elastic spring pessaries in that it keeps the vaginal walls on a constant stretch and thus tends to weaken them, and that its soft covering is liable to become roughened and offensive. Besides, it distends the posterior vaginal pouch. It is introduced on the back or side, by simply compressing the ring and allowing it to expand slowly when within the vagina. The finger then pushes it into place.

Of pessaries which are more adapted to anteflexion (any of the above may also be used for flexion), those of Thomas, constructed on the principle of the cup-pessary or with a long movable anterior bar, are the best—at least, I have had the most experience with them and like them better than any others. The pessaries shown in Figs. 237 and 239, work on the same principle, the cervix being held in the closed or open ring, while the body rests against the smooth shell of hard rubber. The pessary is prevented from turning in the vagina by an anterior movable bar which rests against the inner surface of the pubic arch. The pessary is introduced on the back or side, the movable bar being extended (see Fig. 237) and the broad top of the shell being inserted sidewise into the vagina until the tip touches the cervix (Fig. 238), when the index-finger quickly pushes the posterior segment of the ring backward, and the hinged arch becomes horizontal. Slight adjustment with the finger fixes the cervix in the cup and places the movable bar along the anterior wall.

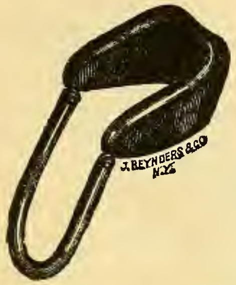

FIG. 237.—Thomas' open cup anteflexion pessary, as introduced and removed.

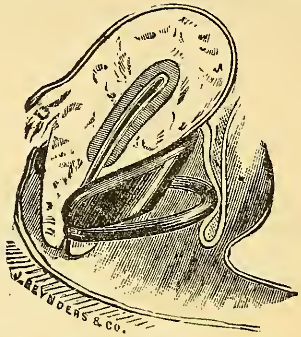

FIG. 238.—Thomas' cup anteflexion pessary in position.

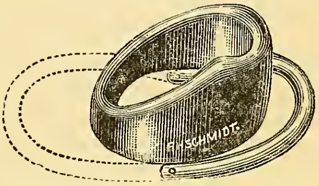

FIG. 239.—Thomas' cup anteversion pessary with ring.

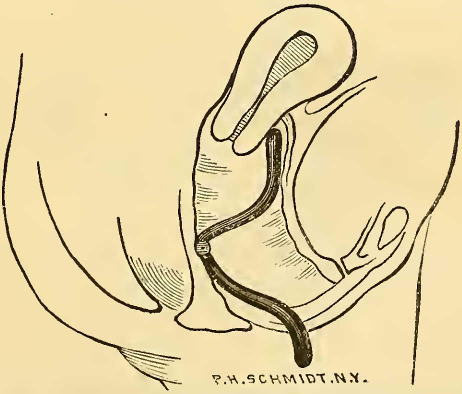

FIG. 240.—Thomas' hinge anteversion pessary during introduction.

In the pessary with open cup simple pressure against the anterior vaginal pouch with the top of the cup, the direction of the force being directed from the hinges slightly backward, will cause the hinges to revolve and the movable bar to approach the floor of the cup. The only advantage of this open variety is the non-compression of the cervix in the ring.

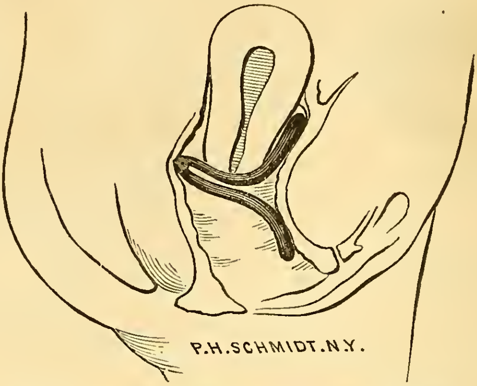

FIG. 241.—Thomas' hinge anteversion pessary in position.

The removal is easily accomplished by hooking the finger into the movable arch and gently drawing on it, when the hinges will revolve and the pessary become extended as it is withdrawn.

An instrument constructed on a similar principle is that shown in Figs. 240, 241, and 242. A modification by Dr. Janvrin, of New York, consists in the elongation of the anterior bar and the addition of a bulb and a small spring on which the anterior bar rests. The spring lifts the fundus up higher. It is inserted extended, like the cup pessary. The uterus rests on the inclined plane, and it is removed by drawing on the anterior arch. This pessary answers better for anteversion than flexion, but is introduced here as a companion to the cup pessaries.

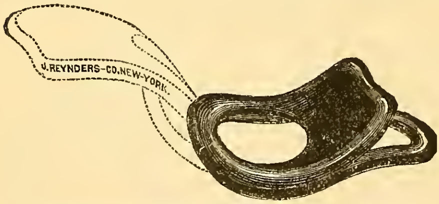

FIG. 242.—Thomas' hinge pessary for anteversion.

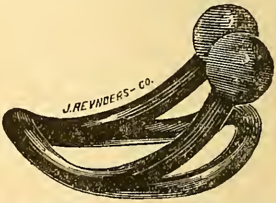

FIG. 243.—Pallen's anteversion pessary.

Another anteflexion pessary of Thomas is shown in Figs. 244 and 245. The cuts illustrate its principle and the manner of its introduction and removal.

All these hinge instruments may be advantageously inserted through a Sims speculum, and their exact position be thus seen.

The great objection to all these complicated hinge and spring instruments is that they very easily become offensive, and indent the vagina. They, therefore, require very careful watching, and special cleanliness. The hinges particularly are liable to indent the posterior wall.

Dr. Thomas has shown special ingenuity in devising complicated anteversion and anteflexion pessaries, and so many sub-varieties of his invention exist that one is constantly being shown by the instrument-makers a new modification or improvement, as "Thomas' last." It is next to impossible to describe and portray them all, and many of them have proved failures and are obsolete. Those above described are most commonly used.

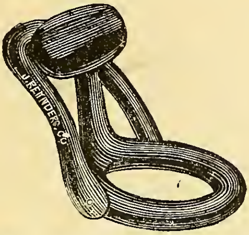

FIG. 244.—Thomas' anteflexion pessary, closed.

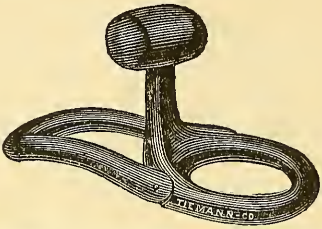

FIG. 245.—Thomas' anteflexion pessary, open.

The principle of Dr. Pallen's anteversion pessary is shown in Fig. 243.

Gehrung has also devised an anteflexion pessary seen in Fig. 246, and constructed on the principle of his anteversion pessary, with the addition of a plate connecting the branches of the superior arch. It is introduced precisely like the anteversion pessary, and would seem equally useful.

A pessary greatly in vogue in England, and also much used here, is Graily Hewitt's anteversion or anteflexion "cradle" pessary (Figs. 247 and 248). It is introduced sidewise, and as soon as the crossbar or the apex of the curves is within the vagina the long bar is pushed behind the cervix, and the other arch rests along the anterior vaginal wall. The uterus then rests against the apex or crossbar, with the cervix in the posterior curve. I formerly used this pessary quite often, but began to discard it when I had met with several instances where it had deeply indented the posterior vaginal wall, and the point of pressure of its crossbar.

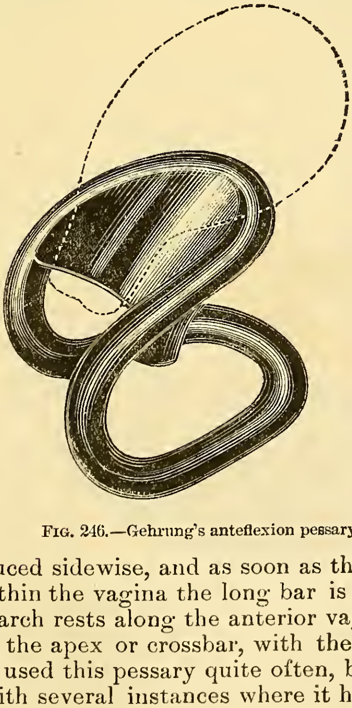

FIG. 246.—Gehrung's anteflexion pessary.

Pessaries which are built to conform to the shape of the vagina, and fill but not distend the canal, are those of Hurd, hard rubber (Fig. 249), Hoffmann (Fig. 250), Trask-Page, inflated soft rubber (Fig. 251).

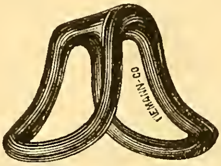

Fig. 247.—Graily Hewitt's anteflexion pessary, with closed bars.

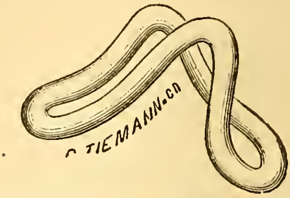

Fig. 248.—Graily Hewitt's anteflexion pessary, with open bars.

These pessaries are supposed to support the uterus, whether its fundus be ante- or retro-displaced, and doubtless do so satisfactorily in many cases. In the Hurd and Hoffmann, the cervix fits into the hole in the centre; with the Trask-Page, one end is before and one behind the cervix. I have no experience with these pessaries.

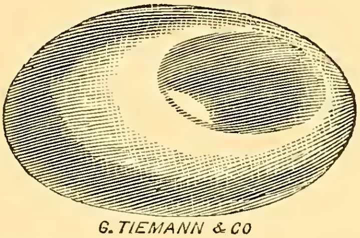

Fig. 249.—Hurd's pessary for ante- or retroversion.

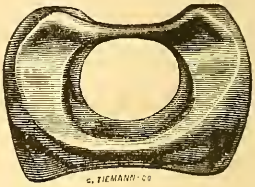

Fig. 250.—Hoffmann's pessary.

I have not exhausted the list of pessaries for anterior displacement, but have given those which are most practical and most in use. The ingenuity of the practitioner must help him to devise new or modify old ones, to suit his cases.

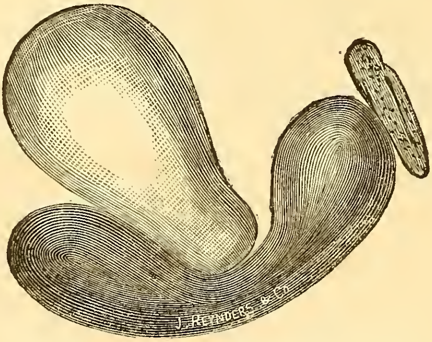

Fig. 251.—Trask-Page's dumb-bell pessary in situ.

There are, of course, various sizes of all these pessaries which are not classified, and therefore cannot be designated. As a rule, three sizes are made of each pessary, one for virgins, one for married nulliparæ, and one for multiparous women.

b. *Pessaries for Retro-Displacements.*

Nearly all pessaries for retro-displacements of the body of the uterus are constructed on the same principle, that of the double lever, the short strongly curved arm of the lever being behind the cervix in the posterior vaginal pouch, the long, mildly curved arm in front of the cervix along the anterior vaginal wall (see Figs. 227 and 266). The fulcrum of these pessaries is at the deepest point of the posterior vaginal wall, where the canal curves upward toward the posterior pouch. It is not a fixed fulcrum, but changes with the position of the patient. The lever principle on which these pessaries act has already been described. It is the only truly physical law observed in the mechanical support of the uterus, which at the same time corrects the displacement and attempts to cure it permanently. The parent instrument of this variety is the original closed double lever pessary of Hodge. It is still used in many cases, particularly where the vagina is large and roomy, with dilated walls and patulous orifice. The broad anterior bar of the pessary rests against the pubic bones, and aids its retention. In this case the fulcrum, or rather resting-place, is also at the symphysis pubis. As a supporter for a prolapsed and retroverted uterus, this broad pessary is often very serviceable, correcting both displacements.

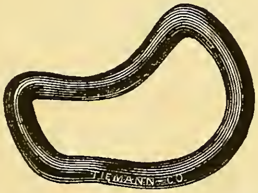

Fig. 252.—Hodge's double-lever retroversion pessary.

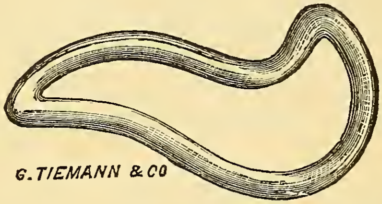

Fig. 253.—Albert Smith's retroversion pessary, front view (sharp curve).

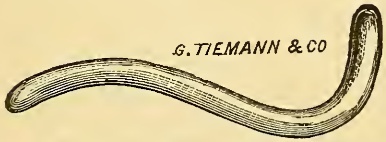

Fig. 254.—Albert Smith's retroversion pessary, side view, showing curve.

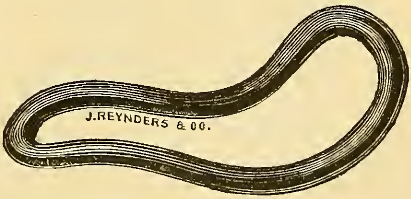

Fig. 255.—Albert Smith's retroversion pessary, front view (gentle curve).

The open lever pessary, in which the anterior cross-bar is wanting, is no longer used, because the two points are liable to injure the anterior vaginal wall.

But the Hodge pessary is liable to turn in the vagina, so as to lie diagonally or transversely. To obviate this Dr. Albert H. Smith, of Philadelphia, modified the original Hodge by lengthening it, to conform more to the shape of the vaginal canal, and by making the anterior arch more pointed, so as to resemble a beak. This pointed extremity reaches entirely or almost to the pubic arch, but never under or beyond it. A Smith pessary, which projects beyond the pubic bones, is too long or has slipped down from behind the cervix. The Albert Smith pessary is now the variety most commonly used, and has, to a great extent, supplanted the original Hodge. It certainly is adapted to the greatest number of cases. The Smith pessary is made in many different sizes and curves, too numerous for description. A useful modification of it is that where the side bars at the short curve are slightly more separated instead of running parallel to a point. In relaxation of the posterior vaginal wall, and short, but capacious vagina, this modification, by which the pessary is somewhat shortened, increases its retentive power. In some of these pessaries, the anterior beak is more sharply bent downward so as not to impinge against the symphysis pubis. While the urethra is spared by this change, the pessary is rather more liable to escape through the vulvar cleft, and may interfere with coition.

Another less known and therefore less popular modification is that known as Sims', the peculiarity of this pessary being that it is more narrow than the Hodge, but of equal breadth at both ends. It answers very well in cases where the greater breadth of the Albert Smith or Hodge distends the vagina too much.

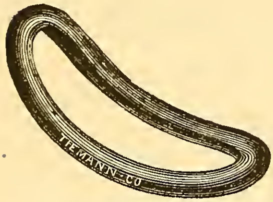

FIG. 256.—Hewitt's retroversion pessary.

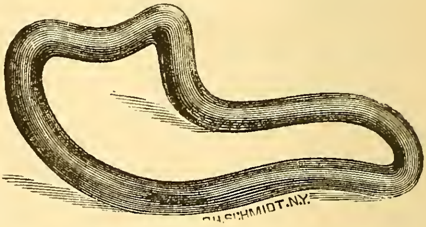

FIG. 257.—Gehrung's modification of Albert Smith's pessary.

Another excellent modification, chiefly useful in cases of shallow posterior pouch, is that of Emmet; it is less curved, flatter than the Smith (very similar to the variety shown in Fig. 255), and serves as the basis from which Emmet models the various shapes he considers necessary. He has had six sizes made, and finds them to answer with minor modifications for the large majority of cases. It possesses the great advantage of not forcing the posterior vaginal pouch too far upward, and not pressing too firmly against the posterior surface of the uterus so as to retroflex it. It is also a good instrument for slight descensus of the uterus. I have found many patients derive comfort from it, in whom the Smith pessary proved too powerful a corrective. A similar pessary is the oval hard-rubber ring of Hewitt, the lever action of which, however, is but slight.

A very excellent modification, which may decidedly be called an improvement, is that shown in Fig. 257. It consists, as is seen, in a central depression of the upper curve, in which the body of the uterus rests and by which the pessary is prevented from slipping sidewise, as readily happens with the ordinary round curve. Another advantage is the higher lateral tension of the posterior pouch, whereby pressure is taken from the centre of the pouch, and the prolapse of the ovaries in Douglas' pouch is rendered less likely. An objection is the pressure of the two lateral horns of the posterior curve, which may, in course of time, give pain, and produce soreness, especially if one or the other broad ligament is tender or contracted.

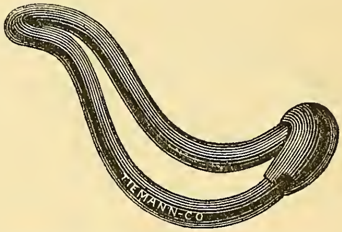

FIG. 258.—Thomas' bulb retroflexion pessary.

For the purpose of distending and filling the posterior vaginal pouch, and preventing prolapse of the ovaries, Thomas has changed the slender posterior bar of the Smith pessary into a thick bulb (Fig. 258), and has at the same time lengthened and narrowed the pessary. The addition of the bulb is an advantage; the lengthening and narrowing, however, diminish its chances of retention. These bulb-pessaries are now made hollow and light, being cast in a mold, but cannot be heated and changed, except very slightly in their long diameter. Formerly they were solid, the bulb being a separate piece, and could not be altered at all. I have had them made to order for special cases, shortening and widening the lateral bars, and have then found this variety very useful, especially in cases of retroflexion of a flabby uterus, where the body always curled backward over the slender posterior bar of the Smith pessary; besides in ovarian prolapse.

A useful form of this pessary, in certain cases of heavy (subinvoluted or hyperplastic) uteri with a steady backward tendency of the fundus, is that in shape of the capital letter U; the uterus rides in this pessary as in a saddle, the cervix being on a level with the lower curve; a slight downward bending of the top of the right (anterior) arch will obviate the otherwise probable pressure on the urethra.

All these pessaries are of course made of hard rubber. Dr. Chamberlain's copper pessary with hard rubber flexible coating is made in this bulbous shape, and has proved exceedingly useful to me in precisely such cases where it is necessary to suspend the uterus, as it were, in a swing.

By making the posterior bulb broader, rather square at each end, a greater lateral tension of the posterior pouch may be obtained, and prolapsed ovaries thus lifted up. The Albert Smith pessaries are also made of elastic strings of brass threads covered with hard rubber (Otto & Sons), and are then springy and slightly flexible. They are very useful in cases where a steady unyielding pressure gives too much pain, and may be employed to habituate the parts to a pessary. I often use them as forerunners to a hard pessary. The malleable copper rings covered with soft rubber, which can be modelled to any shape, possess merely the advantage of malleability; their soft covering renders them unfit for constant use. A pessary which comes under this category, but acts on the single lever principle, is that of Noeggerath. The posterior bar is made either slender or bulbous; the anterior bar always has a urethral depression. It has answered very well with me when I have been unable to shape a Smith to a capacious flabby vagina with gaping orifice.

Dr. Studley, of New York, has devised a Smith pessary with a ring attached to the posterior arch, into which the cervix is to fit so as to ensure the backward fixation of the latter, while the lever action elevates the fundus. I have not used it, but cannot help wondering whether the lever action is not interfered with by the ring. It would seem to me a useful instrument in certain cases of retroversion of the anteflexed uterus, where the flexure of the cervix must be overcome by backward traction while the fundus is elevated. For this displacement I have found it difficult to secure a supporter.

The so-called "sleigh" pessary, which is claimed by Chrobak, of Vienna, and in modified form by Veuillot, of Paris, and Schultze, of Jena, is, no doubt, an excellent instrument for those cases in which the cervix shows a tendency to slip forward instead of backward, as the fundus is elevated. The cervix is held back by the reflected anterior bar, which of course must not be so near the posterior bar as to leave no room for the cervix in the pessary. The modifications mentioned consist merely in the increase of reflection of the anterior bar.

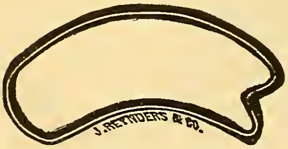

FIG. 259.—Noeggerath's retroversion pessary.

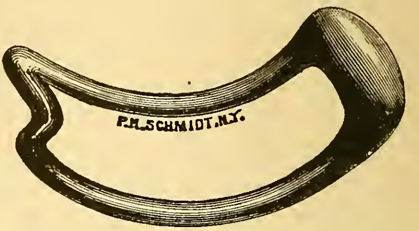

FIG. 260.—Noeggerath's retroversion bulb pessary.

All these lever pessaries are liable to press more or less severely on the rectum, when the body of the uterus shows a tendency to backward displacement while the pessary is in the vagina. The only means of overcoming this pressure is to carefully measure the vagina, and adapt the curves of the supporter to the dimensions and curves of the vagina. Special rules cannot be given.

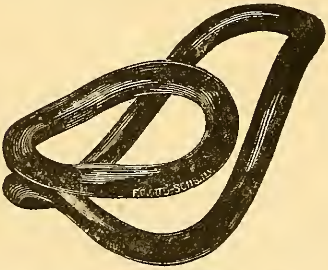

FIG. 261.—Studley's ring-pessary for retroversion of the anteflexed uterus.

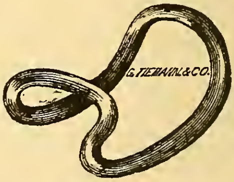

FIG. 262.—"Sleigh" pessary, for retroversion.

Introduction.—No retroversion pessary should be introduced until the uterus has been replaced. The introduction may take place in the dorsal position, or in the left latero-abdominal decubitus. Formerly, the dorsal was universally employed, the pessary being guided sidewise between the labia by either hand, the posterior sharp curve ahead, until the cervix was reached, when the index finger depressed the posterior arch until it was below the cervix, and then pushed it up into the posterior pouch. This plan had two great disadvantages: 1. The rule to replace the uterus cannot well be observed in the dorsal position because the displaced fundus often refuses to become anteverted by vaginal manipulation, and if replaced, as of course occasionally occurs, will at once fall back again as soon as the finger is withdrawn. The sound, it is true, can be and has been used to replace the uterus, the pessary being slipped into the vagina over the sound, which is not withdrawn until the pessary is in place. I have already stated that the reposition of the uterus by the sound is admissible only when the fingers fail to accomplish it. 2. The index finger often finds great difficulty in pushing back the posterior arch behind the cervix, partly because in pessaries with sharp posterior curve it is no easy matter to press the arch so far backward and downward, and chiefly because the parts are so slippery that the finger slips again and again from the slender posterior bar.

I have, therefore, for a number of years introduced all lever retroversion pessaries in the latero-abdominal position, first replacing the uterus by the

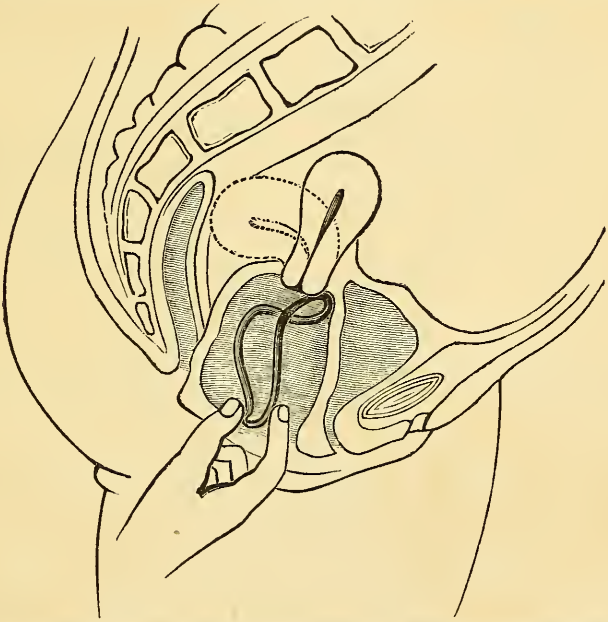

Fig. 263.—Introduction of a lever pessary (Albert Smith's). Patient in left latero-abdominal position. First step. (P. F. M.)

fingers, for which maneuvre this position has special advantages. In cases of extreme difficulty the knee-breast position was used. And I have reversed the method of introducing the pessary, inserting it with the concavity of the long curve downward, that is, upside down, then turning and adjusting it. The method which I pursue, and which I have not seen described elsewhere, but which no doubt is practised by many gynecologists to whom naturally its simplicity and efficiency has recommended it, is the following:

The patient being in Sims' position, the uterus is replaced by two fingers in the usual way. The dimensions of the vagina are then taken and a properly curved pessary of correct size chosen. This is dipped in warm water and then in vaseline or any emollient, and grasped between thumb and first two fingers of the right hand, with the posterior arch pointing downward. The labia are well separated by thumb and forefinger of the left hand, the operator standing slightly behind his patient so as to admit the light (the pessary can, however, be quite as well introduced under the clothes) and the curved arch of the pessary, P (see Fig. 264), is gently inserted between the labia until it enters the vaginal orifice proper. The resistance of the perineum (which is quite strong in nulliparæ or if the pessary is large) is easily overcome with but little pain by steadily and gently pressing back the pessary as soon as its posterior arch is within the vagina; or the index finger of the left hand may do this. As the perineum is retracted, the pessary is pressed inward until its posterior bar rests in front of the cervix in the anterior vaginal pouch. The transverse diameter of the pessary corresponds to the longitudinal diameter of the vulvar cleft. This is the first step (Fig. 263).

The second step begins by gently rotating the pessary, so that its right hand bar, R, stands slightly higher than the left hand bar, L; the pessary crosses the vulvar cleft diagonally. This is done in order to place the right upper curve of the posterior arch, RP, more in reach of the finger. The index finger is now introduced *above* the pessary, and with palmar surface upward passed *under* the posterior arch P, and the point RP, seized by the first joint of the finger. It is of vital importance that the finger should be assured of a perfectly firm grasp of this spot of the pessary. If necessary, the left hand may seize the projecting beak of the pessary A, and rotate the instrument to suit the internal finger. The first joint of the right index finger having firm grasp of the pessary at RP, and the operator standing behind the patient's sacrum, with his left arm resting on her right hip, lifts the arch P up, draws it slightly toward himself and the posterior vaginal wall, and by one rapid twisting motion, from the metatarso-phalangeal articulation and the wrist, rotates the pessary slightly about its longitudinal axis and lifts it behind the cervix (Figs. 264 and 265). If the cervix is long, or situated low in the pelvis, the pessary will spring into the posterior pouch almost with a snap. The third step is to fix the posterior arch P firmly behind the cervix, by placing the index finger on the beak A, and depressing it toward the perineum, thereby tilting up the posterior arch and assuring the replacement of the uterus (Fig. 266).

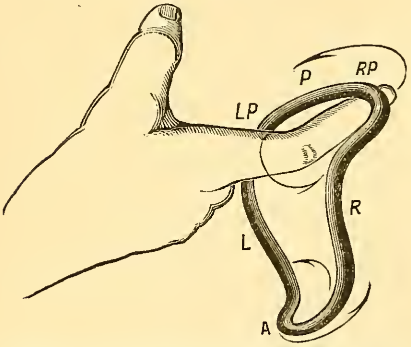

Fig. 264.—Introduction of lever pessary (Albert Smith's), second step, first action. The arrows show the direction of rotation of either end. (P. F. M.)

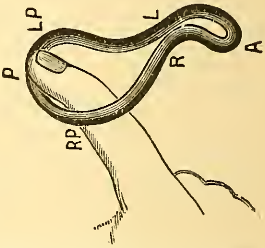

Fig. 265.—Introduction of lever pessary (Albert Smith's), second step, second action. (P. F. M.)

This method of introducing a lever pessary is easy, rapid, and entirely painless, unless too large an instrument be used, or the cervix be so low as to be touched by the pessary during the second step of backward rotation. The difficulties which I have seen beginners encounter consisted in pain during the passage through the vaginal orifice, and failure to seize the proper portion of the instrument with the finger in the second step. The pain at the orifice depended entirely upon the omission to push back the perineum, and the consequent pressure by the right bar of the pessary on the sensitive vestibule. The failure to grasp the right curve, RP, with the finger was due to non-comprehension of the principle of the method, and omission to rotate the pessary with the left hand at the beak, so as to have RP within easy reach. The usual fault was that the pessary was introduced too far, and the arch RP could not be easily reached by the finger. The result of not securing a firm grasp on the arch at RP, was that the traction was always exerted nearer the other curve of the arch LP (see Fig. 264), and the operator was astonished to find that he had placed the pessary behind the cervix, with the arch P pointing toward the rectum, that is to say, wrong side forward. Of course, a pessary so placed could but give pain and do harm. Occasionally, if the parts are too thoroughly lubricated, the finger may slip from the posterior arch, and the maneuvre fail for the moment, even in experienced hands.

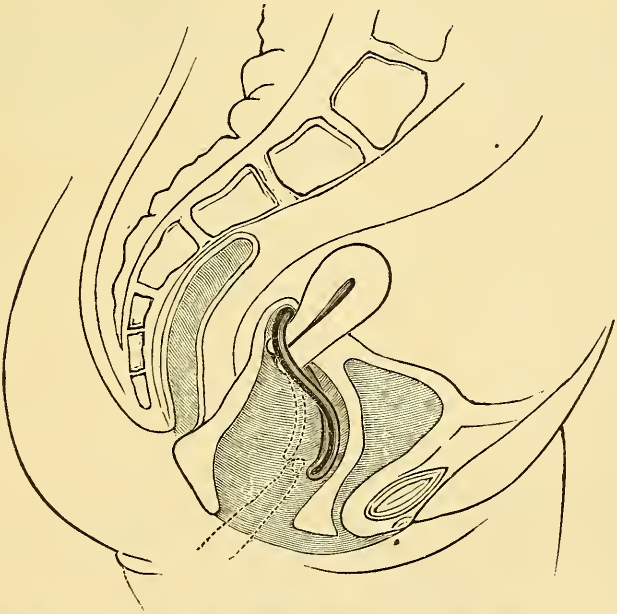

FIG. 266.—Introduction of lever pessary (Albert Smith's). Third step. (P. F. M.)

The double lever pessaries, like Hodge's, Smith's, Thomas', Sims', are best introduced in this manner, but the single levers, like Noeggerath's, are also easily applied as described.

The usual method consists in inserting the pessary with the posterior arch and larger concavity pointing upward, passing it in front of the cervix, and then, with the index finger pressed against the cross-bar *under* the pessary, guiding the posterior arch behind the cervix. The disadvantage of this method in the want of purchase of the finger on the slender bar has already been referred to.

The plan here described at length has the advantage of giving the index a hold on the superior cross-bar of the pessary, which invariably enables the operator to place it behind the cervix if he has chosen his case and his instrument properly.

The steps briefly repeated are: 1. Seize pessary with two fingers of right hand, gently insert it between the labia which are separated by left hand. Press back perineum and insert the pessary till it touches the anterior wall of the cervix. 2. Rotate it by external hand, if necessary, so that its upper end is conveniently reached by the right index; place the latter under the right upper curve of the posterior arch, firmly seize it and lift it backward and upward behind the cervix by a twisting motion. 3. Depress anterior beak to fix posterior bar behind the cervix.

As a rule, the left hand is not needed to manipulate the beak of the pessary.

If the pessary is large or sharply curved, like the U form spoken of, and the vaginal orifice comparatively narrow, it is advisable to distend the perineum to its utmost by the Sims speculum, and introduce the pessary through the speculum. In fact, it is usually good practice to examine the relations and appearance of a retroversion pessary through Sims' speculum, and ascertain by the eye, as well as by the touch, whether it interferes with the motion of the uterus and vagina during respiration or not.

This minute description of how to introduce and fit a lever pessary is by no means unnecessary. The limits of the majority of text-books prevent these details from receiving sufficient consideration, and the young practitioner finds himself totally at a loss for information as to which end of a pessary is to be inserted first, and which curve points up or down. The result is that lever pessaries are often inserted with the sharp curve in front of the cervix, or pressing backward upon the rectum. I have repeatedly removed pessaries which had been introduced in this manner by other practitioners. In no one manipulation have I found the gentlemen taking my private classes in practical gynecology (nearly all of them older practitioners) so deficient, and therefore so anxious to learn, as in this matter of selecting, introducing and adapting pessaries.

I am convinced that the time spent in carefully perusing this chapter will not be wasted, and trust that it will enable practitioners who have experienced the usual difficulties to overcome them with but little trouble.

After introducing a pessary, retro- or ante-version—in fact, any pessary—the patient should be examined in the erect position in order to determine whether the instrument is too large or too small, whether it projects from the vagina—in short, whether it fulfils its purpose of supporting the uterus during the position when such support is most needed.

The removal of these retroversion pessaries is easily accomplished by physician or patient, by simply hooking the index finger into the anterior beak or bar, making gentle, steady, downward traction, and as the instrument is felt to yield, turning it side upward, and withdrawing it in this position from the vagina. By placing one foot on a chair, or crouching, the removal by the patient herself is facilitated.

A retroversion pessary on essentially a lever principle is that of Fowler (Figs. 267 and 268): the perforated tongue goes in front, the bevelled border behind the cervix, and the fundus is tilted up by the downward pressure of the anterior tongue in the erect position. I have never used it, but it is highly recommended by its inventor and by Dr. Sims, and I can readily imagine how in retroversion with descensus it might prove useful. From its construction I should have supposed it to be designed for anteversion, the long tongue supporting the uterus. Dr. Thomas, in his latest edition (November, 1880), calls it "Fowler's pessary for anterior displacements;" the directions of the inventor, however, are for retroversion.

A retroversion pessary, constructed for another object, is the galvanic lever pessary of Hanks (Fig. 269) for amenorrhea. The galvanic current generated by the action of the acid vaginal secretion on the alternate copper and zinc beads, might possibly stimulate the uterus to growth and metrostaxis; but I doubt whether the soft parts would long endure the pressure of the beads at the posterior segment.

Abrasions and indentations made by lever pessaries are usually found behind the cervix and along either descending branch of the pubic arch. In the latter spot the injury is generally a longitudinal sulcus cut by the slender side-bar of the pessary.

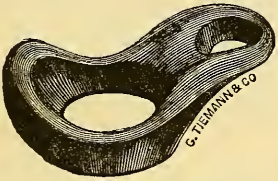

FIG. 267.—Fowler's retroversion pessary.

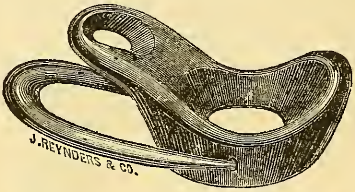

FIG. 268.—Fowler's retroversion pessary with anterior movable bow.

c. *Lateral displacements* are but little benefited by vaginal pessaries. Some ingenious gynecologists have endeavored to lift up the latero-verted or flexed fundus by elevating the corresponding side of an anteversion cup pessary, or the bar of a retroversion pessary, but their efforts have not been very successful. The only supporter which really draws the displaced cervix back and pushes the latero-verted fundus up toward the median line is one which gains it purchase in the uterine cavity. It is shown in Fig. 297, and acts by straightening the uterus, the lower flange on which the cervix rests being of unequal width, the wider on the side toward which the cervix points. The object is thereby to push the cervix toward the median line. The origin of these lateral displacements, either in congenital shortening or cicatricial contraction (after cellulitis) of the broad ligament of the affected side, usually prevents any efforts for the relief of this condition from being successful.

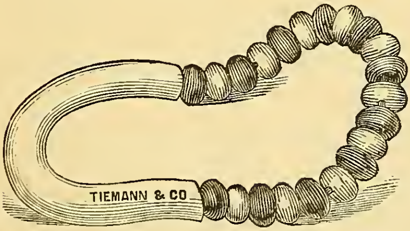

FIG. 269.—Hanks' galvanic retroversion pessary.

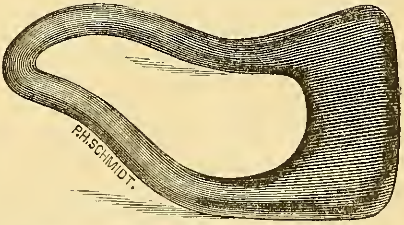

FIG. 270.—Modified Thomas' bulb pessary.

d. For *prolapsus of the ovaries* certain modifications of lever pessaries have been devised, all designed to prevent the recurrence of the prolapse by stretching the posterior vaginal pouch in the antero-posterior direction or laterally, and by relieving pressure on a prolapsed and adherent ovary. The former indication is more or less filled by Thomas' bulb pessary with different-sized bulbs, broader, thicker; the latter, by Gehrung's retroversion pessary with central depression, or one of Thomas' bulb pessaries similarly or unilaterally bevelled out. The usual variety of ovarian prolapse is behind the uterus in Douglas' pouch, or one of the retro-lateral pouches. The retention of a prolapsed ovary by a pessary is by no means so easy as that of the fundus uteri. The extreme mobility of the ovary renders it very liable to slip down behind the pessary, when the pain of its compression will soon herald the accident and require the removal or change of the pessary.

The utility of glycero-carbolized pledgets of cotton in retroversion and prolapsed ovaries, as a means of support when hard pessaries are not borne, has been sufficiently pointed out under tampons, as also the benefit to be derived from Taliaferro-Bozeman's column of cotton in displacements with parametran infiltrations and hyperemic conditions of the uterus and adnexa.

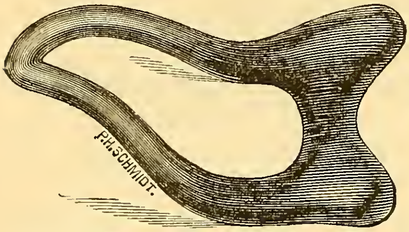

FIG. 271.—Modified Thomas' bulb pessary for prolapse of ovaries.

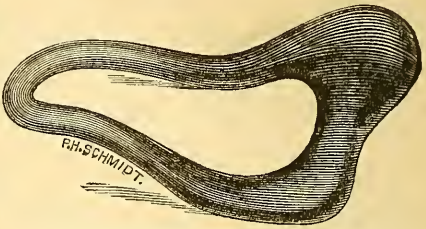

FIG. 272.—Modified Thomas' bulb pessary for prolapse of ovaries.

By packing the anterior vaginal pouch thoroughly full of glycero-carbolated cotton pledgets, the cervix may be crowded against the posterior vaginal wall and the uterus retained in anteversion. If the fundus shows a tendency to retrovert in spite of this, the posterior cul-de-sac may also be filled with cotton, and the whole may be supported by a column. These tampons should be changed every day, or other day, until a permanent supporter can be worn.

e. *Pessaries for Cystocele, Rectocele, and Prolapsus Uteri.*

The best cystocele pessary, in my opinion, is Gehrung's anteversion pessary (Fig. 228). Indeed, all anteversion pessaries are, to a certain degree, useful in cystocele. Skene has devised a special cystocele instrument shown in Fig. 274. An elastic ring, Fig. 275, will also answer when no hope of cure of the cystocele is entertained. The Gehrung pessary, with daily tannin pledgets between the branches, offers the best hope of cure. The cystocele pessary of Bozeman acts entirely by its size, and is liable to become offensive. Rectocele is relieved by a large Hodge, or Smith, or a ring pessary. A cure is generally effected only by a plastic operation.

Vaginal pessaries for the relief of prolapsus uteri et vaginæ consist mainly in such contrivances as act by their size, and by distending the vaginal walls to their utmost. These instruments then rest on the floor of the pelvis, and are prevented from being forced out by whatever contractility exists in the perineum and vaginal orifice. As regards curative properties, they are all worthless, except one, the largest size of Gehrung's anteversion pessary. In construction many are faulty and dangerous, unless very carefully watched. Of these latter, the old time-honored Zwanck, with widespread wings, is the best example; it is not yet obsolete, unfortunately. I have seen one case of vesico-vaginal fistula produced by the pressure of one of these wings. It keeps up the uterus, true, but at the expense of all hope of ultimate cure, and with danger to the patient, unless she be intelligent enough to remove it daily, and keep her vagina well cleansed. That of Noeggerath is built on the same principle, and open to the same objections. They are introduced, closed, and expanded by a screw mechanism in the handle when in the vagina.

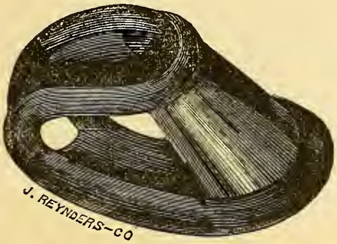

Fig. 273.—Bozeman's soft-rubber pessary for cystocele.

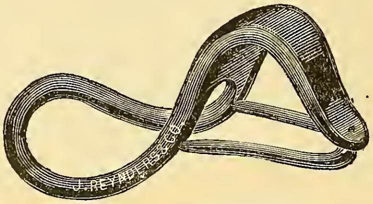

Fig. 274.—Skene's cystocele and anteversion pessary.

The large, thick ring pessaries of Martin, Braun, and others, Fig. 277, are made of glass, hard rubber, wood, varnished canvas, etc., and are a necessary evil in some aggravated cases of prolapsus in old, withered patients. They keep up the uterus, if retained (wherein they may be aided by a T-bandage), and that is all. In many cases, however, that is all that is expected or possible. So far as possibility of injury is concerned, the inflated soft-rubber bags of Gariel and Braun are certainly the best; they are introduced, closed, and expanded with air or water, and can easily be emptied and refilled by the patient herself. They require daily removal and cleansing, being best kept overnight in a basin of carbolized water. The large glass balls shown in Fig. 278 need no description. All these instruments, it will be seen, still belong to the primeval age of the science of mechani-

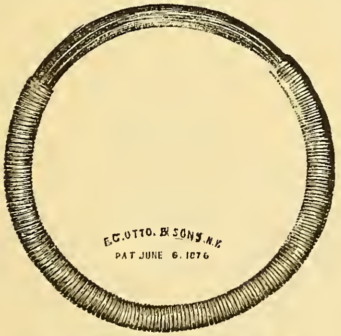

Fig. 275.—Peaslee's elastic ring pessary.

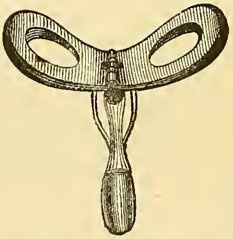

Fig. 276.—Zwanck's prolapsus pessary. It is introduced with closed wings and expanded by turning a screw in the handle.

cal support in uterine displacements. They are simply described and still largely employed for want of something better.

Gehrung's largest sized anteversion pessary has, in my hands, perfectly retained a complete prolapse of uterus and vagina. The inventor relates a number of such cases in a recent article in the *American Journal of Obstetrics.* Before I succeeded in having the proper Gehrung's pessary made out of Hodge's pessaries, I used the Albert Smith, simply approximating the posterior bar and the anterior beak, until the former stood exactly above the beginning of the smaller curve where it bends down toward the anterior beak; the distance between these two points was two inches. With this largest sized pessary I have retained one of the worst prolapses I ever saw, in a woman sixty years of age. She wore the pessary for months with perfect comfort, and for aught I know, is wearing it still. It kept up the anterior wall of the vagina so perfectly, that the uterus could not descend. By separating the bars at the posterior curve more than usual, the retentive power is increased. Any large Albert Smith or Hodge pessary may thus be converted into an excellent supporter for prolapsus uteri at a moment's notice. (I am informed that Dr. Joseph Schnetter, of New York, claims this variety as his invention. I came upon it accidentally, as described, some three years ago, through the chance exhaustion of the instrument-maker's stock of Hodge pessaries.)

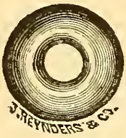

FIG. 277.—Thick ring pessary for prolapsus.

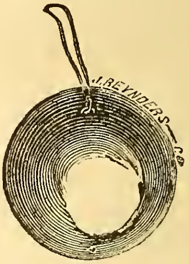

FIG. 278.—Glass globe pessary.

It is scarcely necessary to say that every prolapsed uterus should be replaced before introducing the supporter. The dorsal position answers for the application of all these instruments.

More than usual care should be exercised in guarding against excoriation and ulceration while these supporters are worn; the great pressure of the uterus, which constantly endeavors to force its way down, would naturally lead to some such injury. Occasionally, a prolapsus is unintentionally cured by the cicatricial contraction of the vagina following an ulceration produced by the too long retention of one of these large pessaries. I recently saw such a case, as the result of five years' retention of a glass ring. As the extent of such ulceration cannot, however, be limited at will, it is hardly fair to the patients to allow them to run the risk, even with a possible chance of cure.

3. *Vagino-abdominal Supporters.*

Supporters which are furnished with attachments to bands encircling the body are used either for retro-displacements in which a lever pessary fails to retain or lift the fundus, or for prolapsus of the vagina and uterus, which overcome all the intra-vaginal instruments mentioned.

The cases of *retro-displacement* requiring an external support for the internal pessary, are those of short retro-cervical pouch, with heavy, enlarged, perhaps adherent uterus. In these it frequently happens that no mere vaginal instrument is retained or answers the purpose; the stronger upward pressure of a pessary held in place by an abdominal belt and sacral strap is required to deepen the posterior pouch, stretch the adhesions and elevate the fundus. Pessaries of this kind are those of Cutter (Fig. 279), and Thomas' modification (Fig. 280). Dr. Thomas has modified Cutter's pessary also by adding a thick bulb to the upper bar. The rubber tubing by which these pessaries are attached to the abdominal belt are designed to exert an elastic upward pressure. The peculiar curve of the pessary adapts it to the posterior vaginal wall. Occasionally these pessaries may be used to elongate the anterior vaginal pouch. I have not succeeded in securing particularly good results from these supporters, since they generally failed to push up the fundus. Indeed, if the uterus was really adherent or very heavy, the supporter usually slipped down, so as to emerge from the vagina, or prove inert. The addition of an anterior tube passing up over the pubes might make the instrument more serviceable.

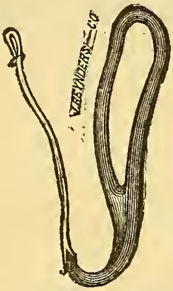

FIG. 279.—Cutter's stem-pessary for retroversion.

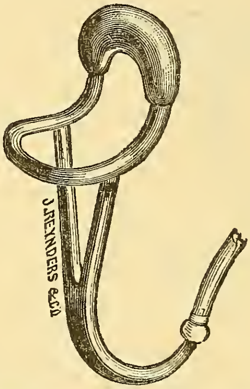

FIG. 280.—Thomas' chair-pessary with stem for retroversion and prolapsus.

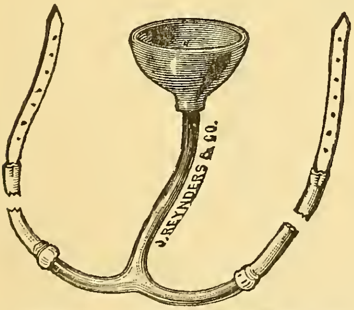

FIG. 281.—Thomas' cup and stem supporter for prolapsus. (Modified from Cutter.)

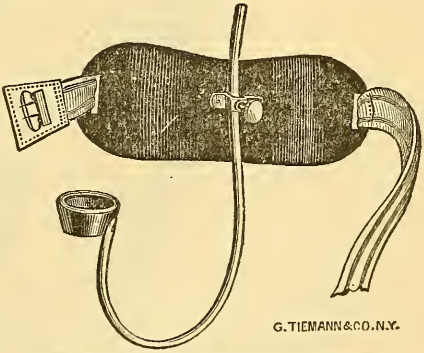

FIG. 282.—Tiemann's supporter for prolapsus.

As soon as the vagina is fitted for it, an intra-vaginal supporter should be applied.

For prolapsus the complicated apparatuses seen in Figs. 280 to 286 are probably as good as any in use. The number of these uterine supporters is legion, many of them being patented and sources of income to their owners, if not of benefit to the women who buy and wear them. The principle upon which they all act is apparent on a glance at the diagrams; and so also their defects. A small cup, ring, or olive is designed to fit directly over the cervix and hold up uterus and vagina. The former often succeeds, but the latter as often fails because the flabby, redundant vaginal walls force their way down beside the central supporter, and are bruised and excoriated between it and the pelvic wall. It may be assumed as a fact that all such supporters which actually retain a prolapsed uterus and vagina of the third degree, do so by exerting a pressure on whatever point they happen to touch, which is sure, sooner or later, to produce an ulceration, the discovery of which demands the removal of the supporter

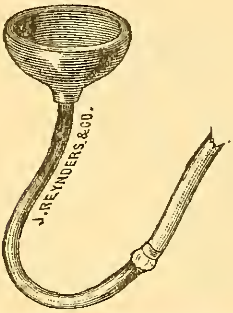

FIG. 283.—Cutter's cup and stem pessary, for prolapsus.

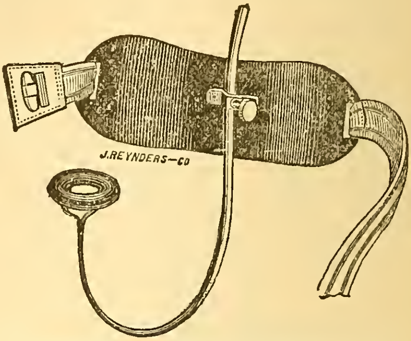

FIG. 284.—Cutter's ring and stem supporter for prolapsus.

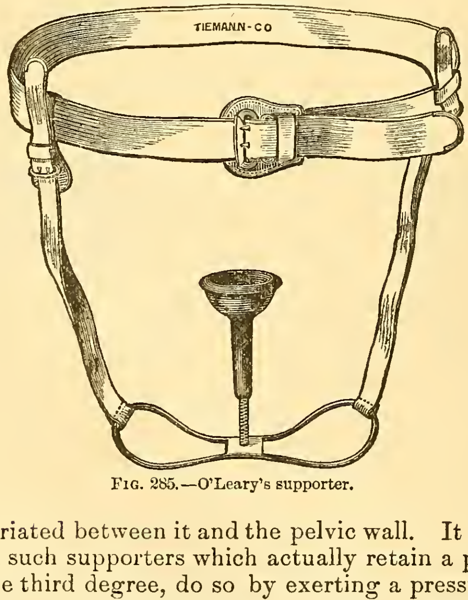

FIG. 285.—O'Leary's supporter.

until the injury is healed. Besides, the immovable stems which it is unavoidable to give these instruments in order that they may possess sufficient resisting power to retain the uterus, generally are the cause of considerable pain to the patient, each movement forcing the tender uterus down on the immovable support. To obviate this, the stems were made of elastic steel springs, or of rubber tubing; or a spiral wire spring was inserted into the stem. But the elasticity of the stem was either too great (and then the uterus came down) or too little (and the pain was the same); or the constant oscillation of the spiral spring produced nervous symptoms similar to those following masturbation, as I saw in one case.

Besides, the expense of these contrivances (in this country, at least) renders them beyond the means of the very women who need such supporters most, the hard-working women of the laboring classes. A poor woman who has to do washing and ironing, or scrubbing, or carry a pail of water up three or four flights of stairs, and who is not able to rest herself after confinement, soon acquires a prolapsed uterus, and cannot afford to spend five or six dollars for a complicated supporter, which is easily spoiled and which after a few days may prove useless. The ideal pessary for complete prolapsus uteri is yet undiscovered. I really do not know of a cheaper, more efficient and, for its possible curative properties, more desirable supporter for these cases than the large tampon of cotton soaked in glycerole of tannin and introduced every day by the woman herself and retained by a T-bandage. I have already described this supporter under Tamponade of the Vagina.

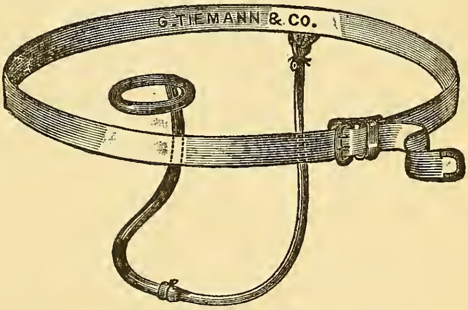

FIG. 286.—Cutter's ring pessary supporter.

The *dangers* of vaginal pessaries may be gathered in part from the remarks attached to each variety. Complicated and hinged pessaries are far more likely to cut into the vaginal wall, produce offensive discharge and excoriation than simple hard-rubber rings. The same is true of soft pessaries as regards the discharge. The longer a pessary is left in the vagina uncleansed, the more it will be incrusted with calcareous deposits, and the more irritating will it become. Cases have been observed in which a Zwanck perforated the bladder, and instances of injury of the rectum, and of Douglas' pouch have been reported. These accidents were mostly produced by the clumsy old pessaries, which were wanting in all mechanical principle and acted only by their bulk. But cases of ulceration of the vaginal wall from Thomas' cup, Hodge's and Smith's lever pessary, are occasionally met with. I have seen one instance of a localized cellulitis near the left descending ramus of the pubic arch from a too large Hodge, and one case in which one of the hinges of a well-fitting Thomas cup pessary, which had been left in the vagina for five months, contrary to particular directions, had perforated the rectal wall. The minute fistula only admitted a fine anatomical probe, and healed without treatment in a week after removal of the pessary. With due attention to a proper choice of pessary, to cleanliness and with occasional supervision, such accidents should not and will but rarely occur. Worse results are not reported to have followed, except one case of myelitis supposed to have followed a pessary, cited by Verneuil; and Hegar and Chrobak each noticed cancerous infiltration at a spot where the pressure of a pessary had produced granulations. Such cases are certainly rare exceptions, and cannot weigh as counter-indications to the use of pessaries.

The CURATIVE *results* from pessaries are not as encouraging as we could wish them to be. If applied at an early stage of the displacement, and especially at a time when the natural involution of the pelvic organs—uterus, ligaments, and cellular tissue—favors a *restitutio ad integrum*, pessaries may, after a certain time, several months or more, produce an entire cure of the displacement. This is particularly true of retroversions, prolapsus, rectocele, and cystocele. Later on it is the exception to find the relaxed ligaments restored to their normal tone and tension. Still, I have seen within a year an old retroversion changed almost to an anteversion by a five months use of an Albert Smith pessary; and we should not despair of a perfect recovery if we do not neglect other local means (astringents, hot or cold injections) and general tonics to strengthen the system.

While the puerperal state is a particularly favorable time to act upon the displaced uterus (and I have introduced a retroversion pessary as early as the eighth day), we must not expect too great results even then. An inveterate retroversion or retroflexion may be benefited for a while until the patient rises and walks about, when usually the flabby uterus flexes over the posterior bar of the pessary and this opportunity for cure is lost. Only rest in bed, until subinvolution has been entirely completed, two to three months, or longer, might achieve a cure.

With this doubtful prospect as to an entire cure in the aggravated cases of each displacement, we are still obliged to resort to pessaries as the best palliative measures at hand. By perseverance and ingenuity, entire recovery will occasionally be accomplished even in these bad cases. The minor degrees are readily susceptible of cure.

Dr. Thomas states that in the treatment of no form of uterine disease has he experienced so much satisfaction and accomplished so much good for his patients, as in anterior displacements. He does not claim to have cured the displacement or distortion, however (at least he speaks only of "giving relief," being "rewarded by success," etc.; nowhere of *cure* in that chapter of his new edition); and I cannot help thinking that a large portion of the relief experienced by the patients referred to by him was due to the very means asserted by Dr. Emmet, the elevation of the whole uterus. This, Dr. Thomas denies; but I certainly have seen no sharp flexion of long standing become straight through the use of one of his anteflexion pessaries, or those of any one else, although great relief is undoubtedly afforded which may even continue after the pessary has been removed. According to this author, greater skill is required to select and adjust pessaries for anterior displacements, and they are more readily productive of danger than retroversion pessaries. Probably I have not entirely grasped the peculiar action of these pessaries, but my experience has led me to a different conclusion, which I know to be shared by many prominent gynecologists. The danger of ulceration from the pressure of one of the complicated hinge instruments, above described, I admit, of course; but I have failed to observe any very great difficulty in selecting or choosing a proper pessary for an anteversion or anteflexion (at least, so far as I could judge), or in fitting it to the vagina. The same rules as to size and adaptation to the vaginal walls apply here (only, I think, in a less degree) than with retroversion pessaries. And as regards frequency of indication, I have found at least ten retroversion pessaries called for by the symptoms, to one for anterior displacement. Perhaps this is the reason why I have met with so little difficulty in choosing the latter. To properly fit a lever pessary in a case of acute retroflexion with short posterior vaginal pouch, or of heavy retroverted uterus of the third degree with thickened and contracted utero-rectal ligaments, or of rectocele and lacerated perineum, has always seemed to me the severest test of the ingenuity and mechanical skill of a gynecologist in this department.

The results obtained in patients who are able to give themselves the best possible care are, of course, much better than can be expected in the poorer classes. Such success as reported by Dr. F. B. Watkins, of Richmond, Va. (*Virginia Medical Monthly*, November, 1875), has certainly not been my experience in a number of cases probably larger than those reported by him, and treated on the same principles. In 215 cases of uterine displacement (retroversion 139, anteversion 49, prolapsus 27), in which he employed mechanical supports he achieved the following results—*Retroversion:* Complete recovery, 114; partially relieved 23; slight or no improvement, 12. *Anteversion:* Recovery, 34; partially relieved, 9; slight or no improvement, 7. *Prolapsus:* Recovery, 22; partially relieved, 4; slight or no improvement, 2. Total: Recovery, 170; partial relief, 36; slight or no relief 21. The vaginal supporters used were all constructed on the Hodge closed lever principle, of block-tin wire and hard rubber, accurately fitted. No vagino-abdominal supporters with fixed ends were used.

Résumé of rules.—A brief recapitulation of the rules governing the introduction and supervision of vaginal pessaries (including vagino-abdominal) may facilitate the remembrance of the directions given in the preceding pages.

1. Always be sure of the diagnosis of the nature and degree of displacement before resorting to a pessary.

2. Always replace the uterus before applying a pessary. This applies particularly to retro-displacements. It is well to replace the uterus repeatedly, every day or twice daily, for several days before introducing a pessary. The replaced organ may be supported by cotton tampons in the interval, if it is desired to distend and toughen the vaginal pouch; or the object of relaxing the abnormally stretched uterine ligaments may have been obtained by the mere repeated replacement. In flexions, chiefly anteflexions, the frequent straightening of the uterus, or conversion into the opposite flexion by the sound, will often prove beneficial before introducing a pessary.

3. Never insert a pessary when there is evidence, by the touch, of acute or recent inflammation of the uterus or adnexa, or when pressure by the finger on the parametrium (where the pessary is to rest) gives decided pain.

4. When the uterus is not replaceable, that is, when adhesions bind the fundus down, use great caution and discrimination in deciding whether an attempt should be made and is justified by the symptoms, to elevate the fundus by manual or instrumental means, or whether the elevation should first be tried by the gradual pressure of a pessary (this applies only to retro- and latero-versions). If neither is to be recommended, do not introduce a pessary until local alterative and absorbent measures have effected a resolution of the adhesions.

5. Always choose an indestructible instrument, if possible.

This does not apply to prolapsus uteri.

6. Always measure and estimate the vagina carefully before choosing a pessary, and be careful to adjust the pessary in every particular (size, curve, width) to that particular case. No two vaginæ are exactly alike.

7. If the vaginal pouch is not sufficiently deep to accommodate a pessary (anterior pouch, for ante-displacements, posterior pouch for retro-displacements), defer the attempt to fit a pessary until the pouch has been deepened by daily tamponing with cotton, or by the upward pressure of a Cutter or Thomas vagino-abdominal supporter. Or the pouch may be gradually deepened by using first a small (slightly curved, in retro-displacement) instrument, and gradually increasing its size (or curve) until the desired size and shape for permanency is reached.

8. Never leave a pessary in the vagina which puts the vaginal walls to the stretch, and which does not permit the passage of the finger between it and the wall of the vagina. This does not apply to prolapsus uteri.

9. A vaginal pessary, which projects from the vulva, is displaced.

10. A pessary which gives pain must be at once replaced by one which is painless.

11. A well-fitting, properly chosen pessary should not only give no pain, but should be a direct source of comfort to the patient.

12. Always examine the patient on her feet after introducing a pessary, or when it is desired, at her return, to ascertain its efficiency in sustaining the uterus during walking and exertion.

13. Always tell the patient that she has a pessary in her vagina, or she may not return, in spite of your directions, and the pessary may remain for years to her ultimate great discomfort and danger.

14. Always tell the patient to return within a week after the first introduction, in order that the position and working of the pessary may be looked after, and that, if it does not suit, it can be removed and a better one inserted. Tell her that several trials and various instruments may be required before one is found which she can wear permanently. Also let her return for inspection once every four to eight weeks, as the case may require. Tell her that if she fails to do so the pessary may cause ulceration, for which treatment will be needed.

15. Tell the patient that she will need to wear the pessary for months, perhaps years, before a recovery can be expected.

16. Never introduce a pessary which the patient cannot remove herself.

17. Tell the patient to remove the pessary herself, if it gives pain, and show her how to do it. When she has removed it, let her present herself at once for examination.

18. Tell the patient to use daily vaginal injections for cleansing purposes. If she notices profuse discharge, add astringents; if the discharge is sanious or purulent, let her come at once, as the pessary probably has caused abrasion.

19. Tell her, on removing a pessary to test the result, that the permanence of the benefit obtained therefrom cannot be determined for several days or weeks.

20. Always direct your patients to relieve all superincumbent pressure on the pessary by a proper support of their skirts; and if the displacement be anterior, aid the internal supporter by an abdominal (suprapubic) pad.

All pessaries may be introduced in the knee-chest position when it is desirable or possible to replace the uterus only in that position. A Sims speculum elevates the perineum, the air enters and expands the vagina, and the pessary (chiefly in retroversion and prolapsus) is introduced by touch and sight, and the patient laid on her left side. For aggravated retroversion, and for prolapsus of ovaries or uterus, this position offers many advantages over the left semiprone decubitus. Care must be taken to remember that the position of the patient is reversed, and that the pessary must be introduced accordingly.

4. *Intra-uterine* (*Stem*) *Pessaries.*

Intra-uterine pessaries consist of straight or slightly curved stems of various lengths and diameters, which are introduced into the uterine cavity in order to maintain its straight direction. They are composed of some solid substance (metal, wood, ivory, glass, hard rubber) or of soft, flexible material (soft rubber, bougie, catheter), or they are complicated, consisting of links of metal (copper and zinc), or of divergent springs to insure their retention in the uterus.

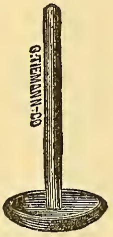

Fig. 287.—Hard-rubber stem-pessary.

The solid stems are smooth, slender, round rods, two and one-eighth inches in length (they are usually one-eighth to one-fourth of an inch longer in the shops, which is *too* long), mounted on a disk, or cup, or bulb, which rests against the cervix and prevents the stem from being pushed farther into the uterine canal. Stems of this variety are shown in Figs. 287 and 288. The best are those made of hard rubber. Dr. Noeggerath prefers lead. The sizes vary from that of a No. 10 to No. 14 bougie, American scale, or even larger. The tip is rounded and smooth.

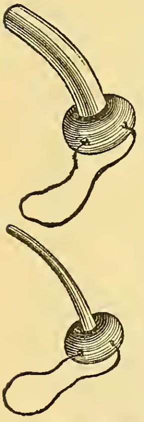

Fig. 288.—Curved stem-pessary.

The soft stems are made of soft rubber, in very much the same shape, or of a bougie or elastic catheter, and can be cut to any size desired. The complicated stems, those which diverge, are those of Peaslee (Fig. 289) and Chambers (Fig. 290) with steel springs, that of Coxeter, of soft rubber (Fig. 291), that of Thomas, alternate copper and zinc beads on a flexible metal stem (Fig. 292), and numerous others.

There are besides a number of still more complicated contrivances designed also to insure retention of the stem by connecting it with a vaginal supporter. Such are those of Kinloch (Fig. 293), Byrne (Figs. 294 and 295), Thomas (Fig. 296), the latter is also made without the anterior movable bar, for retroflexion); Studley (Fig. 298 with straight, Fig. 299 with curved stem), Conant (Fig. 297).

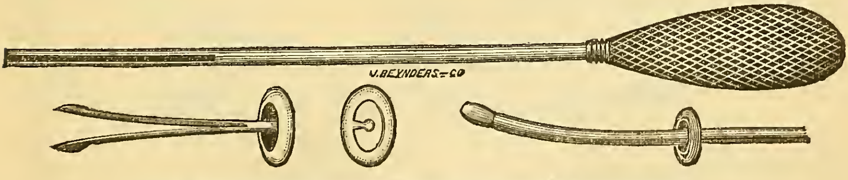

Fig. 289.—Peaslee's spring stem-pessary, with staff for introduction.

These combination stem and vaginal pessaries are generally designed for retroflexion, but answer equally well for any case where the stem is not retained in utero. That of Thomas', seen in Fig. 296, is, I take it, judging from its inventor's recent expressions, obsolete. It is in any case a rather formidable-looking combination. That of Conant is perhaps the only contrivance of any service in correcting a lateral displacement. Unfortunately, the frequent production of this displacement by inflammatory contraction of one broad ligament to a great extent invalidates the utility of an instrument the *point d'appui* of which is the uterine cavity. One vaginal wing may be made larger than the other when it is desired to press the displaced cervix toward the other side. Noeggerath has variously modified this instrument.

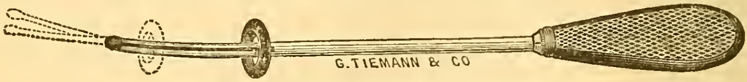

FIG. 290.—Chambers' stem-pessary, with director.

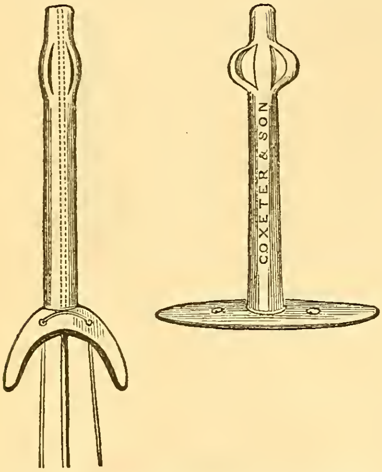

FIG. 291.—Coxeter's soft rubber self-retaining stem-pessary.

The best stems are the smooth straight ones, and the best straight stems are those of hard rubber. Stems with metal divergent springs are dangerous, and should not be used. The soft rubber inflatable stems are less injurious, but easily become foul. Thomas' galvanic pessary is used solely for its stimulating effect in uterine atrophy and amenorrhea. I have had excellent results with it, when I could secure its retention. It is so slender as to escape from most uteri, but may be fixed by cotton wads or a cup pessary.

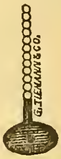

FIG. 292. Thomas' galvanic stem pessary.

Of the utero-vaginal combinations, those with movable connections of soft rubber, like Kinloch's and Studley's, are certainly safer than the immovable hard rubber bar of Byrne. However, this immobility of the connection between stem and lever pessary is precisely the advantage claimed by Byrne for his instrument.

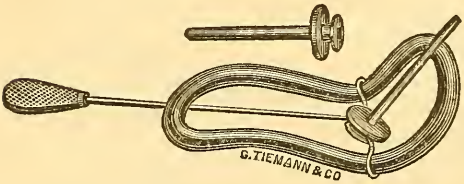

FIG. 293.—Kinloch's stem-pessary for retroflexion, with staff for introducing stem.

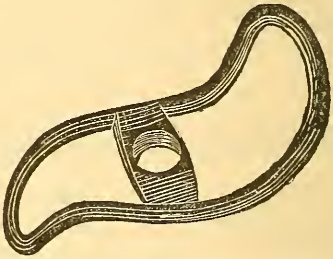

FIG. 294.—Byrne's vaginal-pessary with sliding crowbar into which the stem is screwed.

The *indications* for the use of straight stems introduced into the uterine cavity, and retained there for a greater or lesser time, are the existence of some distortion of the canal, which is irremediable by simple vaginal supporters. Such distortions (in contradistinction to displacements, viz. versions) are the flexions, ante-, retro-, and latero-, chiefly those of congenital origin, the ante- and latero-flexions. I have already stated that chronic displacements of the uterus are only exceptionally *cured* by vaginal supporters ; this is true to a still greater degree of the distortions. The cure of a chronic anteflexion by a vaginal pessary is probably still to be reported. With retroflexions the chances are better, for the uterus may at least be straightened, and the flexion converted into a version, which I have shown to be readily remedied and sustained by a pessary. This inability to straighten a sharply flexed uterus by a vaginal support was recognized by the earliest advocates of pessaries, and led to the construction by Möller, in 1803, of a stem composed of an elastic catheter with flexible wire stylet, which could be bent to any desired curve. Amussat followed, in 1826, with a smooth ivory stem, and twenty years later Simpson, Valleix, and Kiwisch almost simultaneously introduced intra-uterine stems. Since then, the controversy as to the utility, safety, and, indeed, the justifiableness of intra-uterine supports under any circumstances has been waged with a vigor and a diversity of opinion seldom met with even in the realm of medical science.

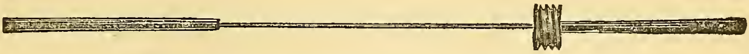

FIG. 295.—Byrne's stem-pessary mounted on staff for introduction.

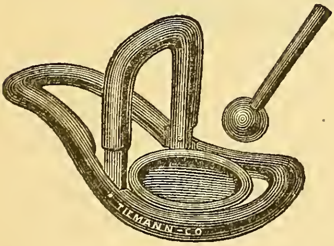

FIG. 296.—Thomas' stem-pessary for anteflexion with vaginal support.

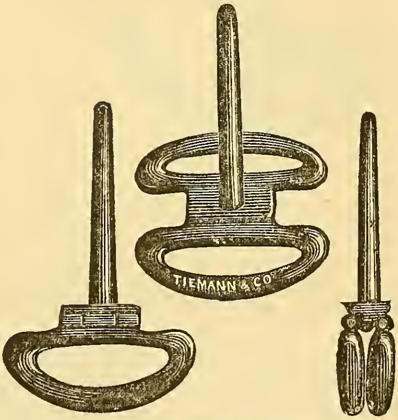

FIG. 297.—Conant's stem-pessary for lateral displacement.

While some gynecologists claim to have achieved numerous cures with intra-uterine stems, without the slightest injury, others again decry them as an " invention of the devil," as utterly unjustifiable, and entirely useless.

Both parties contain names of the highest eminence, living and dead. In order to give the reader an opportunity of judging of the evidence on both sides, I will reproduce the following list of authorities from Chrobak:

Pro.—Amussat, Simpson, Lee, Valleix, Gaussail, Velpeau, Kiwisch, C. Mayer, Detschy, E. Martin, Veit, Olshausen, Hildebrandt, Haartmann, Winckel, Schröder, Lewis, Hennig, Kristeller, Graily Hewitt, Priestley, Savage, Greenhalgh, Beatty, Courty, Weber, Grenser, Benicke, Beigel, Bantock, Chambers, Rigby, Atthill, Routh, etc. To these may be added, Van de Warker, Eklund, Noeggerath, Goodell, Chadwick.

Contra.—Depaul, Raciborsky, Piorry, Gibert, Amussat (later), Cazeaux, Scanzoni, Hüter, Hohl, C. Braun, Seyfert, Credé, Freund, Spiegelberg, Spaeth, Habit, Retzius, Tilt, Meadows, Oldham, Bennett, West, Duncan, Tait ; besides, Skene, Byford, Barker, Emmet, Thomas.

A middle position is occupied by Schultze, Peaslee, Hegar and Kaltenbach, G. Braun, Albert H. Smith, Chrobak. These latter gentlemen do not wholly discard the stem, but permit its use in certain cases in which vaginal supporters utterly failed to rectify the distortion, and the gravity of the symptoms warrants the use of a remedy which *may* produce the most serious results.[1] Such cases are either aggravated anteflexions, with dysmenorrhea and sterility (whether such flexions are congenital or not is still a moot question) ; retroflexions, in which the flabbiness of the uterus prevents a lever pessary from straightening the organ (the retort-shaped uterus) ; retroversion of the anteflexed uterus, in which the posterior vaginal pouch is so short, and the cervix so sharply curled up anteriorly as to afford no purchase for a lever pessary ; lateral displacement not depending upon cellulitis ; finally, amenorrhea from atrophy or deficient development of the uterus.

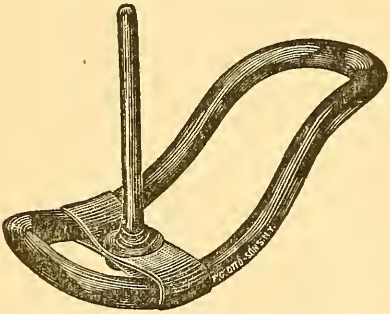

FIG. 298.—Studley's straight stem-pessary.

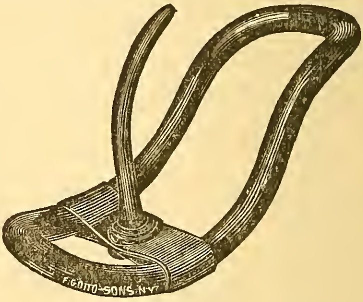

FIG. 299.—Studley's curved stem-pessary.

To specify in detail the exact conditions in which the risk attending the use of a stem is justified, is scarcely possible. An exclusion of all counter-indicating circumstances, the failure of previous measures for rectifying the distortion, chief among which measures are, of course, vaginal pessaries, and the necessity of relieving the patient, must formulate the indication to the mind of each practitioner.

The justifiableness of inserting a stem simply for sterility probably produced by anteflexion will be governed by the same rules as those for other no less dangerous measures—the dilatation of the internal os by tents, dilators, and the knife. It is allowable to let the patient run a certain amount of risk in order to gratify her desire for maternity, but she should be made acquainted with the risks, and from her should come the decision.

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[1] My distribution of the additional names depends on the opinions expressed by their possessors during the elaborate discussion of Dr. Van de Warker's paper on the "Intra-uterine Stem," at the meeting of the Am. Gynecological Society in Boston, in June, 1877 (Gyn. Trans., Vol. II.), and on their written or expressed opinions found in recent literature.

Counter-indications and dangers.—All inflammatory conditions of the uterus or adnexa, whether acute or chronic (except perhaps *very* old adhesions), immobility of the uterus, extreme tenderness of uterus and adnexa, endometritis; uterine hemorrhage, pregnancy—absolutely counter-indicate intra-uterine stems.

The *dangers* are: production of peritonitis or cellulitis, hemorrhage, shock, perforation of fundus (Pallen), any of which accidents may be followed by death.

The advocates of stem-pessaries claim that with due care their use is no more dangerous than that of any other proportionate surgical treatment of the uterus, and admit a ratio of accidents of one or two per cent. An occasional death is reported, but so has division of the cervix, or dilatation with sponge tent been followed by death. The frequent serious accidents and deaths formerly reported (Hueter, in 1870, collected twenty-three deaths) were doubtless due to carelessness in the selection of the cases, poor instruments, and defective supervision. Noeggerath reports 1 case of hematocele, 1 of acute mania in a hysterical woman, and 1 death from peritonitis in over 100 cases; Winckel found no death among 247 cases, and Van de Warker collected 393 cases with but thirteen serious accidents. I have seen one case of pelvic cellulitis and one of pelvic peritonitis, both terminating in recovery, from the protracted wearing of a jointed Greenhalgh, copper and zinc beads, and a smooth hard-rubber stem, against positive directions to remove the stem by the attached strings as soon as pain was felt. On the other hand, numerous reports are made of cases where the stems have been worn for months, and even a year, without the slightest evil consequences. I removed a smooth, hard-rubber stem this Fall from a patient with sterility from retroversion of the anteflexed uterus, who had worn it and a lever pessary for over five months without the slightest disturbance or interference with her menstrual or marital functions. It was removed simply in order to test the position of the uterus and her capability of conception. Dr. C. S. Ward, of New York, reports a case of safe retention of a glass stem for four and a half months.

While there are certain cases in which nothing will do as much good as a stem-pessary, nothing will straighten the canal but a stem, and in which we are therefore justified in using it, we should always carefully weigh the benefits and risks before deciding to insert it, and remember that, however tolerant the endometrium may be of momentary insults, it occasionally resists, with great violence, any permanent irritation. And even the smoothest stem will prove an irritant to many uteri.

The question may be summed up by saying that, while certain cases will react disagreeably against the introduction or retention of a stem-pessary, the majority will bear it well, if the proper precautions (to be enumerated hereafter) are observed.

Chrobak puts the question very fairly as follows: "Not having in the relatively small number of cases in which I employed the intra-uterine stem (35), seen marked better results than from other measures, I have gradually restricted its use, although I must admit that I do not consider the stem-pessary, with proper caution, a specially dangerous instrument, and permit its use when all other treatment has failed and the severity of the symptoms justifies a treatment not quite free from danger." Personally, I am convinced that the stem could be used with great advantage in very many cases, chiefly aggravated anteflexion, if it were always introduced at the home of the patient, under anesthesia, and the patient kept in bed for at least a week after.

The *precautions* to be scrupulously observed in the use of stem-pessaries are the following: 1. Carefully exclude all counter-indicating circumstances. 2. Always choose a stem which is at least one-fourth inch shorter than the uterine cavity, the exact length of which should have been measured by sound or probe. The majority of stems sold in the stores are at least one-fourth of an inch too long, and consequently press upon the fundus. If a shorter stem had been used, the accident reported by Dr. Pallen of perforation of the fundus through the stem being driven into it by a sudden fall, could not have occurred. 3. Use only a smooth instrument, without springs. The soft-rubber stems of Coxeter, Squarey, and others are exceptions to this rule, as also the galvanic stem of Thomas, which is intended to irritate. 4. Always insert the stem, if possible, at the house of the patient, under anesthesia if previous dilatation is to be employed, and keep the patient in bed for at least one week. 5. Attach a cord to the bulb of the stem and tell the patient to remove it, if she experiences the slightest suprapubic or pelvic pain, which continues longer than a few minutes. 6. Tell the patient to avoid violent exercise, lifting, sexual intercourse, until the stem has been worn at least several weeks and a tolerance has been established. 7. See her often and watch her carefully; as Dr. Goodell says, and he is an ardent advocate of the stem under the precautions here enumerated, "this instrument is a good one, a very good one—to watch."

The *results* of the treatment by intra-uterine stems have been fairly expressed by Dr. Chrobak in the above quotation. Whether old sharp flexions are ever *cured* by the prolonged straightening of the canal with a stem, is still undecided. If the stem chances to produce just sufficient irritation to thicken the angle of flexion, a cure may result, but this exact limit is difficult to obtain. We may either irritate too little or too much. As regards sterility and dysmenorrhea, the results are better. Strange to say, conception has even taken place with a stem in utero, and the gestation has in most instances gone on to term. Winckel, Olshausen, Goodell, and others report cases, some twelve or fifteen all together, I believe. Of course, the stems in these cases did not possess the broad cup for the cervix shown in Fig. 287, but merely a small bulb to prevent its slipping into the os. The cure of dysmenorrhea, depending on stenosis of the uterine canal by prolonged wearing of a stem, is not uncommon. Amann reports nine cures in sixteen cases.

Mode of introduction.—The exact dimensions and curve of the uterine canal must first be ascertained by the sound; especially must the length of the canal from external os to fundus be carefully measured. A stem, corresponding in thickness and length to the canal, is then chosen. I have already expressed my preference for the smooth, hard-rubber stem, of which there are several sizes. Special care should be taken to have the stem at least one-eighth of an inch shorter than the uterine canal, measuring from the bottom of the cervical cup. A stout cord, six inches long, is tied about the base of the stem, to enable the patient herself to remove it. The stem is best introduced through Sims' speculum.

The cervix being seized by the tenaculum, the uterus is drawn down and straightened, and the stem, impaled on a sponge-tent expeller or slide-applicator, is inserted into the os and pressed upward, exactly as a laminaria or tupelo tent would be. If the canal is sufficiently large, no difficulty is experienced in passing the stem up until the cervix rests in the cup. But, if there is an obstacle at the internal os, the steel-branched dilator may be passed through the internal os, and the canal dilated as far as seems necessary. If there is difficulty in causing the straight stem to follow the curve of the canal, the sound may be introduced, and by its side a fine probe; the sound is then withdrawn and the stem inserted along the probe as a guide, which is then removed. In some cases I have found it impossible to force the stem through the angle of flexion through a Sims speculum, but have succeeded easily by putting the patient on her back, and manipulating the fundus uteri with the external hand until I had straightened the uterus, the stem in the cervical canal being at the same time guided and supported by the internal finger; as soon as the canal was straight the stem was pushed up and the fundus down, and its insertion at once accomplished. I have found that under such circumstances, I could succeed better without an applicator, merely guiding the stem into the cervix with my fingers, and manipulating the uterus between both hands. As soon as the stem has reached the fundus, it is slid off from the applicator, and the speculum removed. Care must be taken to allow the cord to project slightly from the vagina. The cup or bulb should always fit tightly over the os. If the stem is introduced for anteflexion, no support is needed to prevent its escape; the cervix will rest against the posterior vaginal wall, and I have never seen a stem escape when the uterus was anteverted. If it shows a tendency to retrovert, however, some support must be given to the bulb of the stem, and this may be done either by the cup-pessary, shown in Fig. 296, or by attaching the stem to a lever pessary by a rubber band (Fig. 298), or by fixing it in a movable hard-rubber slide (Fig. 294). Supports which are immovably connected with the stem are, in my opinion, more dangerous than those in which an elastic rubber band or hinge permits the uterus to move about with every motion of the diaphragm. The stem may either be inserted first and the vaginal pessary second, which is best feasible through a Sims speculum, or the lever pessary is first introduced as above described, and then the stem through the speculum. The difficulty of bringing the retro-displaced cervix properly into reach, renders the latter method less desirable. I have frequently introduced both stem and lever pessary without a speculum, taking care not to dislodge the cup or bulb of the stem while slipping the lever into the posterior vaginal pouch. As a rule, I have found it unnecessary to connect the stem with the lever pessary at all, since if the latter did its work well, and anteverted the uterus, the posterior vaginal wall retained the stem by itself. I have had both pessaries worn without being connected for months, and neither became displaced. In retroversion of the anteflexed uterus, this combination of stem and lever pessary is the most satisfactory method of lifting up the fundus and straightening the uterus. Some gynecologists (Schröder and Amann) keep the uterus anteverted for a few days by packing the anterior vaginal vault with cotton.

The introduction of a stem-pessary should be as carefully performed as that of the sound. Only a size which will readily pass should be chosen.

To remove a stem it is only necessary to hook the point of the index finger into the cup, or press it gently from side to side until it becomes loosened, and then gently withdraw it. An oozing of bloody mucus may follow its removal. Until the patient has become used to the stem, it should be removed before each menstrual period, and reintroduced after the flow. Later on, it is not necessary to remove it. In the beginning the flow will probably be somewhat increased, but only a very decided increase will in itself demand the removal of the stem. The straightening of the uterine canal during menstruation often causes the stem to slip out of the uterus. Coition should be prohibited until tolerance to the stem is assured. It is obvious how impetuous coition might injure the fundus uteri, and gentleness is therefore imperative at all times.

How long a stem may need to be worn can scarcely be determined beforehand. The answer might be, as long as the patient can bear it. We can confidently expect to find no permanent improvement before six months, probably not before one year. And it has already been stated how improbable it is that the patient will be able to wear the stem so long. Usually, in outdoor patients before many months have passed, some indiscretion, some exertion, or accidental circumstances will have brought about pelvic pain or peritoneal irritation or ovarian congestion (most commonly) and the stem is removed, because the physician very wisely declines to take the risk of increasing these possibly premonitory signs of evil.

Several rules should always be observed, and they are to keep watch of the patient, see her frequently, and from time to time remove the stem only to reintroduce it at once, if all is right (as shown by bimanual examination) ; tell her to avoid unusual exertion, and to remove it at once by the attached string (which should be left until the first menstrual period is passed, at least, ere which it will have become offensive) if she experiences abdominal pain or if profuse hemorrhage comes on. A disavoidance of this direction will probably result in inflammation, as occurred to the two patients of mine already referred to.

XIII. Artificial Impregnation.

The cause of sterility in a certain number of cases appears to be an obstacle to the entrance of the sperm, or its fructifying element into the uterine cavity, or the inability of the vagina to retain the semen sufficiently long after coition to enable the spermatozoa to enter the cervical canal. In the one case the vagina possesses the normal retentive power, and cervix and vagina occupy the correct relation; but the obstacle lies in a narrow or distorted uterine canal; in the other variety, the uterine canal is normally wide, but the physiological angle between cervix and vagina is wanting, and the semen oozes out of the vagina with the withdrawal of the penis.

A constricted uterine canal may be dilated, or incised, or straightened, by one of the various methods described (dilators, tents, discission, stems), and the normal angle between uterus and vagina may be restored by a pessary; and conception may then occur in many instances. But when it does not occur, or when the operation of dilating the uterine canal is refused, or the canal contracts again, or when we find it impossible to restore the retentive power of the vagina (as in congenital absence of the perineal body, or abnormally short vagina, or shallow posterior vaginal pouch) we are at our wits' end to devise some means to gratify the patient's desire for maternity. In such cases, then, when the precaution has been taken to ascertain the healthy character (presence of lively spermatozoa in sufficient number) of the semen of the husband, we may propose the procedure which forms the subject of this chapter, and will be justified in adopting it if husband and wife give their consent.

There is one other condition in which impregnation may be possible only by this method, and that is when the husband is hypospadiacal and the semen is not deposited in the vagina at all, or so near the orifice as to be removed by attrition when the penis is withdrawn.

The impregnation of a woman by artificial measures consists in the introduction of the semen into the uterine cavity through a syringe or some similar instrument in the hands of the physician.

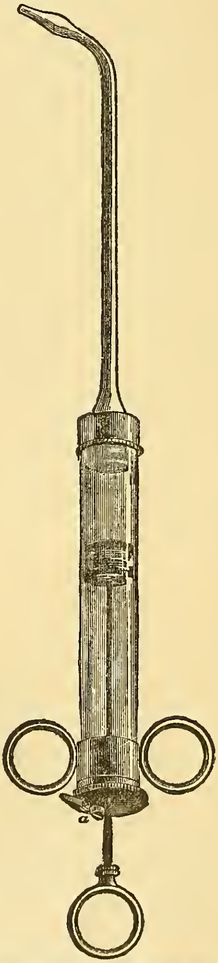

FIG. 300.—Sims' syringe for artificial impregnation.

This idea was derived from the experiments of Rossi and the Abbé Spallanzani in 1782, who injected semen into the vaginæ of sluts in heat, and saw impregnation follow. In 1865, Dehaut published a pamphlet on the subject, and in 1866 Sims reported his numerous experiments. The practice has also been tried by Harley, Courty, Pajot, Sinéty, Eustache, Hegar and Kaltenbach, and others whose results have not been published.

Sims introduced the semen into the uterine cavity in the following manner: An indispensable condition is the presence of healthy semen and its inability to penetrate through the canal of the uterus in the normal way. The microscope will decide the former question—the reason of the fruitless efforts of years—and the absence of spermatozoa in the cervical mucus on repeated examinations soon after coition, the latter. A day and hour having been fixed for the experiment, the vagina is washed out with an alkaline solution, and coition performed shortly before the arrival of the physician. The wife retaining the recumbent position, the physician places the glass syringe, shown in Fig. 300, in a bowl of warm water at about 98°, and when sufficiently warm inserts its nozzle into the vagina and allows it to remain there a moment until he is sure that its temperature conforms to that of the body. He then draws up a few drops of semen from the pool in the vagina, gently inserts the nozzle of the syringe into the cervical canal until it passes the internal os (Sims gives one and nine-sixteenths of an inch as the limit of insertion), and by half a revolution of the piston expresses one-half a drop of semen. The syringe is allowed to remain quietly for ten or fifteen seconds, and then withdrawn; the patient remains in bed for several hours afterward.

Great caution should be observed to make the injection very slowly, and not to inject more than one-half to one drop of semen. More is probably unnecessary for fructification, and might produce shock or inflammatory reaction. All the counter-indications to intra-uterine applications (acute, and subacute inflammation of uterus, or adnexa) apply also to this method.

Courty's plan differs only from that of Sims, in the manner in which he procures the semen. The male organ is covered with a condom, which is not drawn quite tight over the point of the glans. The semen will then be caught in the blind end of the condom, whence it can be obtained by opening the latter with scissors and drawing it into a warmed syringe. (I have repeatedly adopted this plan when I wished to procure semen for examination under the microscope for the detection of spermatozoa, in cases of sterility where doubts existed as to which was the guilty party.)

In *Pajot's* method the semen is introduced by means of a long canula with a piston, into which some of the fluid is scooped up from the vagina and then expressed when the canula has been inserted into the cervical canal. The object of this modification is to avoid the dangers of injection.

De Sinéty has practised the injection of semen through a thin rubber tube, which he pushed to the fundus with forceps, the cervix being exposed through Cusco's speculum. Two or three drops of semen are then injected gently; the tube being slowly withdrawn to the cervical canal, where it is allowed to rest for five or six minutes. In some cases the semen is violently expelled by uterine contractions, as soon as the canula is withdrawn; S. then closes the mouth of the tube with a cork, and leaves it in utero for two or three hours.

Eustache, of Montpellier, proposes a plan which will meet with serious objections. He transfers the duties of the syringe and piston-tube to the husband, who is to be directed to introduce his finger into the vagina immediately after coition, dip it into the semen, and carry the latter up to the external os; if the cervix is displaced, the finger replaces it in the axis of the vagina, and then endeavors to coax the spermatozoa to enter the cervical canal.

If this method were to be confined to experts, it might answer very well, so far as the mere manipulation is concerned. But, fortunately, sterility is uncommon among the wives of gynecologists; and the layman can scarcely be expected to know enough of the anatomy of the female sexual organs to practise this maneuvre intelligently and successfully.

The methods of the other observers correspond to that of Sims.

The cervical canal is, of course, not dilated. If it were, the injection would not be indicated. The injection should be made either within one week before, or one week after the menstrual period. Only one attempt should be made during each inter-menstrual period, and the next flow expected before deciding upon the necessity of repeating the experiment.

Objections and dangers.—The objections are entirely of an esthetical nature; and will probably always interfere with the popularization of this practice. Still, there may always be found one or the other woman who is willing to lay aside her instinctive modesty for the sake of the chance of maternity, and there will certainly be cases in which the trial is justifiable. For such instances I have given this brief description. Sims himself has "given up the practice altogether and does not expect to return to it again."

The counter-indications have already been referred to. Sims reports several instances of colic after the injection of three or four drops of semen (which was the quantity introduced during his earlier trials); Hegar and Kaltenbach mention one case of violent peritonitis produced by very careful injection.

Results.—I find but one case reported in which the attempt at artificial fructification was followed by success, and that is the celebrated case of Sims, reported in his "Uterine Surgery," in 1866. During two years he made fifty-five separate attempts on six different patients. Of these he thinks fully one-half were badly done, or under unfavorable circumstances, and should therefore not be counted. There was thus one conception in about twenty-seven trials.

The patient was twenty-eight years old, had been married nine years without conceiving; had always suffered from dysmenorrhea; her uterus was retroverted, its posterior wall hypertrophied, the cervix conical and indurated, the canal contracted, particularly at the internal os. Besides, the vagina never retained the semen. The latter difficulty was remedied by replacing the uterus and retaining it with a pessary. The other obstructions were overcome by injecting the semen into the uterine cavity. Ten injections were made, two just before menstruation, the other eight between two and seven days after menstruation. Three drops were first injected, and this quantity gradually diminished to one-half a drop. After the tenth attempt conception took place; but unfortunately a fall and fright brought on a miscarriage at the fourth month.

The French are reported to have been successful with this method, but the most explicit expression in this respect which I have been able to find is that by De Sinéty ("Manuel de Gynécologie," 1879), who uses the following words: "The successes obtained, after eight or ten futile attempts, are an encouragement for the repetition of this maneuvre a certain number of times."

It seems to me that the plan of injecting the semen in the knee-breast position, keeping the woman in that position for ten or fifteen minutes longer, so as to give the semen the opportunity to drain into the uterus through the canal rendered patent by the nozzle of the syringe, might possibly be attended with better results than the injection in the dorsal decubitus. The advice recommended by Hegar for aiding the entrance of the semen into the uterus in the knee-chest position by the suction produced by some other person lifting the abdominal wall gently and then allowing it to fall, might also be tried.

XIV. Massage.

By massage is meant the manipulation, kneading, friction, movement, of certain portions of the body. Its object is to stimulate the circulatory and absorbent systems, to increase the flow of blood through the part under manipulation, and to promote the absorption of chronic enlargements, exudations, and infiltrations. Thus, massage has, in recent years been employed by Brandt, in Sweden, Meltzer, in Holland, and Douglas Graham, in this country, for chronic, rheumatic, and gouty swellings; and unquestionable success has attended their efforts. To Brandt is said to be due the introduction of this method into gynecological practice, and Graham and A. Reeves Jackson have also recommended it for this purpose. It was first proposed to treat versions and flexions, inflammation of the uterine mucosa, subinvolution, areolar hyperplasia, and chronic inflammatory pelvic exudations by this method. But, it has been found that damage as well as good can be done by these manipulations, and the practice is now pretty well restricted (in so far as it has become popular in gynecological cases, which cannot be said to be very general as yet) to cases of subinvolution, hyperplasia, and very old indurations from pelvic cellulitis and peritonitis. If the stage of induration has been reached, when the hyperplastic uterus is more like a cartilage than a muscle, even massage will be useless.

The stimulating, absorbent influence of massage, as presently to be described, in promoting the contraction of a soft, flabby, subinvoluted uterus, or the absorption of the adventitious product in a large, hyperemic, hyperplastic uterus, or of a hard, absolutely insensible cellulitic exudation, will be readily understood. The necessity for a careful selection of cases, and the rigid exclusion of all instances in which pressure or friction gives pain or is followed by febrile reaction or tenderness, is equally apparent.

The manner of performing utero-pelvic massage has been recently so well described by Dr. A. Reeves Jackson in an article read before the American Gynecological Society at Cincinnati in September of this year, that I reproduce his words unchanged:

"*Mode of performing uterine massage.*—This may be done by three different methods: 1. Through the abdominal walls; 2, through the abdominal walls and vagina; and 3, through the abdominal walls and rectum.

"1. *Abdominal massage.*—When the enlarged uterus can be felt sufficiently above the pubes to enable any part of its walls or fundus to be grasped between the fingers, very efficient massage may be done without invading the vagina; and this method should be preferred, in all such cases, provided the vagina is small or unduly tender. The bladder being previously emptied, the patient should lie on her back upon a table or hard, unyielding mattress or lounge. The operator then, using both hands, commences by picking up and rolling between the thumb and fingers portions of the skin and other superficial tissues. The entire abdominal surface, as high as the umbilicus, is thus manipulated. The process is then repeated; the deeper tissues being this time taken up and pressed between the fingers, gradually increasing force being employed. These pinchings are alternated with rubbings of the surface with the palms of the outspread hands and the points of the fingers. After five or ten minutes have been spent in this manner, the fingers are sunk deeper into the hypogastric and ovarian regions, and the uterus—so much of it as can be reached—is brought between their tips. The organ is then alternately squeezed and relaxed and rolled between the fingers in every possible direction for twenty or thirty minutes, or until the patient becomes weary.

"All the foregoing processes must be performed in the gentlest possible manner, all increase of force employed being so gradual as to be almost imperceptible.

"In whatever manner the massage is employed, this preliminary manipulation of the abdominal walls is advisable, and sometimes indispensable; for in many cases the pains and discomfort complained of by patients who have enlargement of the uterus, and which are likely to be referred by them to that organ, really have their seat in the walls of the abdomen, and unless these latter become accustomed to the massage—which almost invariably lessens their sensitiveness—it would be impossible to act effectively upon the uterus beneath. In some instances several days have elapsed before the tenderness of the abdominal walls could be overcome; yet this having at last been accomplished, the uterus could be grasped and firmly pressed without causing any great amount of discomfort.

"As already stated, this form of massage can only be used advantageously in the few cases in which the uterus rises considerably above the pelvic brim. Where it has not attained so great a size it cannot be reached in this manner, and the abdomino-vaginal method must be used.

"2. *Abdomino-vaginal massage.*—This is performed by passing the first and second fingers of one hand into the vagina, and placing the fingers of the other hand above the fundus uteri in the hypogastrium. A single finger in the vagina is not sufficient; it cannot be introduced so far as two, and is also not so useful for making pressure or counter-pressure.

"The fingers should be passed first into the space behind the vaginal portion, which is pulled gently forward, and then permitted to return to its former position. This is repeated a half-dozen or more times, when the fingers are pushed higher up, so as to reach the supra-vaginal portion of the cervix and lower part of the body. The upper part of the uterus being now steadied by the hand on the outside, it is pressed between the fingers of both hands, repeatedly, for a few seconds at a time, and then relaxed. Every portion of the organ which can be reached should be subjected to these momentary squeezings. Then the manipulations should be reversed. The intra-vaginal fingers should be drawn in front of the cervix, and the latter pushed backward as far as possible short of causing pain. Then, their ends being passed into the space between the bladder and cervix, and their pulps turned against the latter, the fingers of the outside hand should be so adapted that the uterine body may again be brought between the compressing forces, when the squeezings and imparted movements are to be repeated as before. Alternating with the processes described, the uterus should be frequently elevated in the pelvis and held for a few seconds.

"The entire procedure should occupy from ten to thirty minutes, according to the sensitiveness of the pelvic structures and the degree of tolerance on the part of the patient. It is better not to attempt too much at one time, or we may, by producing pain in, or aggravating tenderness of the parts, find ourselves obliged to suspend the treatment for some days, and thereby lose time.

"(3.) *Abdomino-rectal massage.*—This is, unfortunately, the least available of all the forms of uterine manipulation. I say unfortunately, because, owing to the greater ease with which the uterine body can be reached through the rectum than by the vagina, pressure movements by this method would be much more useful. But here, too, as in the vagina, one finger does not present sufficient surface, and the introduction of two fingers causes too much pain. Indeed, the daily introduction of a single finger into the rectum is likely to be followed by irritability of the part. Hence, this form of massage, if expedient at all—which I greatly doubt—must be confined to a small class of exceptional cases, in which the vagina is so small or so tender as to make it entirely unavailable for the purpose."

The performance of massage with the patient in a warm bath has been recommended by Ziemssen, and seems a useful proposal.

The *counter-indications* have already been referred to and may be summed up under acute and subacute, and all chronic inflammatory conditions of the pelvic organs in which pressure gives rise to pain. Cases of inveterate displacements, of indurated hyperplasia, of old chronic ovarian congestion, of cellulo-peritonitic exudation, with firm fixation of the uterus, will probably be but little benefited, if any, by this treatment. I have had no experience with the method, but, theoretically, am very favorably impressed by it. An objection to it must always remain the necessity of the manipulations being performed by the physician, for it will be difficult to find a nurse sufficiently conversant with anatomy and the pathological features of the case to undertake the various motions safely and intelligently.

Another objection is the danger of mentally and erotically exciting the patient by the continued manipulation of her sexual organs. External massage alone would therefore be preferable.

Results.—Chrobak mentions having obtained good results by abdominal massage in ovarian and fibroid tumors, the edema of the lower extremities having repeatedly been permanently relieved thereby; in one case, absorption of the cyst-fluid occurred. Tense cyst-walls are not so prone to absorption after massage as those in which tension has been relieved by previous tapping. Extra-peritoneal exudations of large size and considerable density, which extended upward so far as to be accessible from the outside, were gradually brought to absorption or to suppuration, and ultimate recovery.

Dr. Reeves Jackson reports three cases of subinvolution and areolar hyperplasia, with parametric tenderness and fixation, in which, after several months of massage, three or four sittings a week, of fifteen to forty-five minutes each, the uterus was found greatly decreased in size and movable, and the patients were very much improved. He admits, it is true, that these were his best results. But, I cannot help thinking that the method has a future, and that particularly in hospitals and private institutions, where there is an abundance of medical assistance, great good can and will be accomplished by it in due time.

XV. The Hypodermic Injection of Ergot.

Ergot has been injected under the skin for uterine hemorrhage post-partum and for fibroid tumors many thousand times since Hildebrandt first published his experience with the treatment in 1874. To give a numerical account of all the cases thus treated, with the results of successes and failures would be impossible, because a large portion of the cases have never been reported. The beneficial influence of ergot injected under the skin in subduing uterine hemorrhage depending on interstitial and submucous fibroids, on subinvolution and hyperplasia of the uterus, has been acknowledged beyond dispute, as also the failure of this treatment in many cases, when the fibroid was subperitoneal or exceedingly dense, or surrounded by a very thin shell of muscular tissue, or when the uterus was in the stage of induration.

In subinvolution and areolar hyperplasia this method has not become as popular as for fibroids, and still it seems, from observations made by so competent and reliable an observer as Leopold, of Leipzig, that much good can be done by a systematic course of ergot-injection in these obstinate cases. This author treated eight cases of uterine subinvolution, five of hyperplasia, and one of membranous dysmenorrhea, with hypodermics of ergot, and found decided benefit as regards diminution of menorrhagia and reduction in size of the uterus, and in the dysmenorrhea case a temporary cessation and permanent decrease in quantity of the exfoliation from the treatment. In subinvolution and hyperplasia, the treatment lasted from three weeks to fourteen months, the average being about three months, and from ten to one hundred and four injections were made, the average being about forty to each patient. Only once did the puncture produce an abscess. When fifty to sixty injections had been given without special benefit, Leopold found that a continuance was not likely to be of particular use. Whatever result was to be expected was surely obtained, wholly or in part, by that time. Leopold agrees with the results of

Hildebrandt as regards the effects of this treatment for fibroids, having in twelve cases with an average of sixty injections, obtained a decided improvement in seventy-five per cent., and no benefit only in twenty-five per cent. Hildebrandt's figures were twenty per cent. cured, sixty-four per cent. improved, and sixteen per cent. not benefited. The results of Scanzoni and Chrobak are not so good, being but forty-five per cent. improved, and fifty-five per cent. not benefited, none entirely cured. A. Martin, of Berlin, even has the discouraging figures of 100 not benefited. Enough, however, has already been written on this subject by various authors to show that the hemorrhage in fibroids (interstitial and submucous only) can be at times greatly reduced and the size of the growth diminished by a persistent employment of this treatment. And that some benefit is to be expected in subinvolution and hyperplasia (so long as the stage of induration is not reached) is shown by the observations of Leopold.

Manner of performing the injection.—The two great objections to this treatment are, 1, the pain which the injections give; and 2, the cellular inflammation and possibly suppuration which frequently follows at the seat of puncture.

To avoid these unpleasant symptoms several precautions should be observed:

1. A perfectly fresh solution of ergot. I have always used (and believe it to be as good as any other more complicated one) a solution of Squibb's semi-solid aqueous extract of ergot, one grain to two minims of water, with the addition of one grain of salicylic acid to the drachm of solution if it is to be kept. Every two minims of this solution thus contain one grain of ergot, and if twenty minims are injected the patient gets ten grains of ergot (equal to the same amount of the so-called ergotine) at each injection—quite as much as should be given at one sitting, if the injections are to be frequently repeated. This solution will readily flow through the ordinary hypodermic needle.

2. The injections should be made in a radius about the umbilicus, extending not more than six inches from that point as a centre, chiefly below it. This is a much better seat than the thigh, which I have seen recommended, and where a possible inflammation will interfere with walking and sitting.

3. The injection should be performed in a particular manner, the skin being lifted up by two fingers of the left hand to the height of at least two inches, and the needle then thrust in to its hilt so as to carry the fluid into the subcutaneous cellular tissue, or even into the substance of the muscle. This is a point of the greatest importance, and pain and inflammation will, to a great extent, be avoided thereby. Even a hypodermic of morphine will produce a dermo-cellulitis if the fluid is injected into the substance of the skin itself. The fluid should be injected slowly, and no fear need be entertained with ordinary care of penetrating the abdominal wall.

4. Always make the injections at the home of the patient, and keep her quiet in bed for several hours afterward, with cold water compresses over the puncture, until experience has shown that she bears the treatment well.

5. Some pain, redness, and even infiltration will follow the majority of injections, but nothing more, if these rules be observed. I have even injected a whole syringeful of Squibb's fluid extract of ergot for postpartum hemorrhage, and have never seen an abscess result therefrom.

6. Accordingly as the injections are borne, they may be made every

other or every third day, and they should be continued for months if any benefit is to accrue from this treatment.

Gynecological Armamentarium.

What instruments to purchase is one of the first questions of the young graduate when he starts out on his professional career. The following list contains all which a general practitioner is likely to need in the department of gynecology. It may be enlarged from time to time as his practice in that branch increases, or special cases demand:

Two cylindrical specula of different size, one small and one medium (celluloid or glass).
One valvular speculum (Nott's or Brewer's).
One double Sims' speculum.
One Sims' depressor.
Two tenacula.
One long uterine dressing forceps.
One Simpson's sound.
One Emmet's silver probe.
One straight hard-rubber screw-stick.
Two hard-rubber elastic applicators.
One Sims' hard-rubber slide-applicator.
One long Buttles' scarificator, with caustic holder on the other end.
One Thomas' dull curette, small size.
One Sims' sharp curette, small size.
One Ellinger's, Miller's, or Palmer's steel dilator.
One long cervical syringe.
Two long sponge-holders.
One long, slender aspirator needle, to fit a hypodermic syringe.
One long, straight, slender-bladed uterine scissors.
One long, slender bistoury, sharp or blunt pointed, fixed in the handle.
One dozen Albert Smith's retroversion pessaries, assorted sizes.
One-half dozen Gehrung's anteversion pessaries, assorted sizes.
One-half dozen Thomas' anteflexion cup-and-hinge pessaries, assorted sizes.
A few, say two each, of Hodge and Peaslee's ring, and Thomas' bulb retroversion pessaries.
One-half dozen each, of sponge, laminaria, and tupelo tents of different sizes.

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